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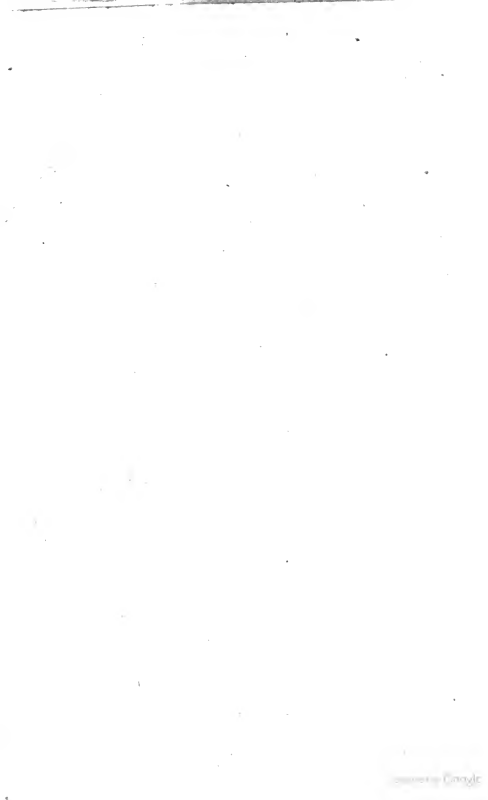


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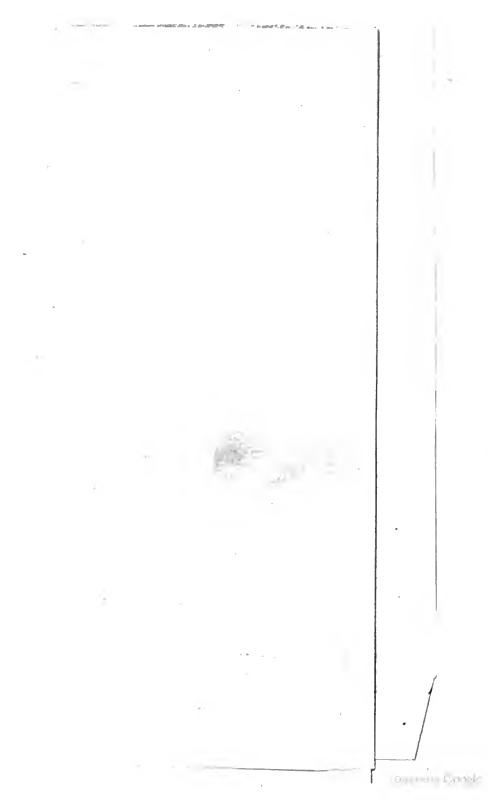
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GENERAL VIEW
OF THE
AGRICULTURE
OF THE
COUNTY OF BEDFORD.

DRAWN UP BY ORDER OF
THE BOARD OF AGRICULTURE
AND INTERNAL IMPROVEMENT.

BY THOMAS BATCHELOR,
FARMER.

Ye generous Britons, venerate the plough;
And o'er your hills, and long withdrawing vales,
Let Autumn spread his treasures to the sun.

THOMSON'S SEASONS.



LONDON:

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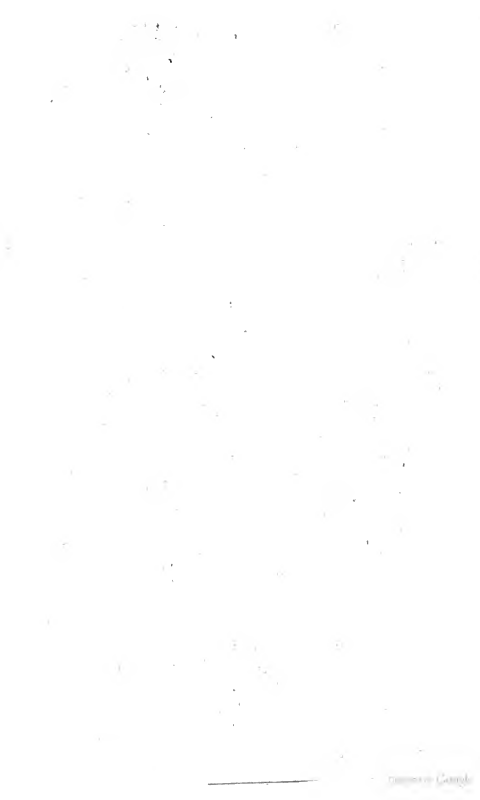


ADVERTISEMENT.

THE desire that has been generally expressed, to have the AGRICULTURAL SURVEYS of the KINGDOM reprinted, with the additional Communications which have been received, since the ORIGINAL REPORTS were circulated, has induced the BOARD OF AGRICULTURE to come to a resolution to reprint such as appear on the whole fit for publication.

It is proper at the same time to add, that the Board does not consider itself responsible for every statement contained in the Reports thus reprinted, and that it will thankfully acknowledge any additional information which may still be communicated.

N. B. *Letters to the Board, may be addressed to Sir JOHN SINCLAIR, Bart. M.P. the President, No. 32, Sackville-Street, Piccadilly, London.*



PREFACE.

THE principal Agricultural Improvements which have recently taken place in Bedfordshire; it will be seen by the following detail, have almost entirely originated with the late Duke of Bedford. I have, therefore, in addition to what has been collected from other sources, and from observation, thought it necessary to extract from Mr. Young's *Annals*, the various accounts relative to His Grace's Experiments, together with Mr. Young's Minutes of Enclosures, &c. under the idea that the Board of Agriculture, and the public, would be more likely to bestow their approbation on a full and particular description of the County, than on a naked detail of the mere commonplace of ordinary Husbandry, which is, I conceive, nearly the whole that a stranger to the County would have been able to collect, without a reference to Mr. Young's publications.

To obtain as much information as possible, inquiries have been made in nearly every Parish in the County; but there are so few variations of practice, arising either from caprice or ingenuity, that the result of many inquiries has only tended to explain and confirm a variety of popular opi-

nions on the minor subjects of Husbandry, in which nearly all Farmers are unanimous.

It has been my endeavour, in various parts of this Survey, to impress on the mind of the reader the utility and necessity of minute experimental investigations; though I have been so circumstanced, as to be able to make very few experiments myself.

It will not be wondered that so few experiments of recent date are reported, as there is scarcely an experimental Gentleman or Farmer in any part of the County, with the exception of Dr. Cartwright, whose attention, very shortly after he went to reside at Woburn, to superintend the experiments of the late Duke of Bedford, was called off, in consequence of His Grace's death, to matters of a different nature.

The various theoretical observations that may be met with, must of course be considered as the Author's own opinion, which, being founded on modern Chemistry, could not be laid before the public in any other shape, or in a smaller compass. Practical writers are much in the habit of depreciating chemical theories; but the most delusive theories are apparently those extemporary ones which are to be found in all authors, which are formed probably in ten minutes, and expressed in perhaps as few words. It must, indeed, be confessed, that a theory which originates solely in the closet, may be extremely delusive

lusive and dangerous; but as what little knowledge I may possess of Vegetable Physiology is grafted on a previous knowledge of ordinary Husbandry, and is applied rather to account for known facts, than to foretel the results of practices which have not yet been tried—I conceive the discussions which are inserted in various parts of this Survey, may tend to prove, that theory is not so fallible, nor practice so infallible a guide, as many have asserted.

The theory and practice of Drilling and Dibbling has been as minutely investigated as was found practicable in a work of this nature, and the rather, as it seems to shew the most eligible means of affording a profitable employment to a burdensome and increasing population.

A minute investigation of the Expenses of Agriculture has not been attempted, as far as I know, by any of the Reporters of the different Counties. It is a subject, indeed, which must have been founded on supposition, and therefore liable to gross and numerous errors, if attempted by any writer who had not the various operations of Husbandry continually passing under observation.

It is a common complaint, that Agricultural Calculations are liable to errors of such magnitude, as lead inattentive readers to false conclusions. With a view to obviate this ground of

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complaint,

complaint, much pains have been taken, in the present instance, to ascertain what may be deemed the Average Price of Corn at the beginning of the present century, and to avoid all local and temporary matters, even in the detail of the minutest divisions of the subject. The principal data which form the basis of the Tables, are derived from the best sources which could be referred to. The greater part of the smaller items are, however, founded on my own personal experience, with such variations as appeared necessary to adapt local observation to general use.

The real Expenses of Cultivation vary with the season, and with the disposition and skill of each individual Cultivator. The Tables are intended to exhibit the medium between enterprise and indolence; and as they are formed on a regular and systematic plan, any person who deems his own Expenses to be more or less than appears by the Tables, may correct every error by tracing it to its source, and thus, if he thinks proper, may form a new Table, adapted to his own ideas, and his usual Rotation of Crops. The utility which, it is conceived, will be found in the Tables, consists in their affording a foundation for choosing a Course of Crops adapted to the nature of different soils, and enabling the Farmer to judge what kind of rational hopes of profit may be placed on every sort of Crop in common use, and
how

how far the advantages which may attend other kinds of Crops are of a permanent, or of a local and temporary nature.

In estimating the proportional produce of different Crops and Courses, the single oversight of taking the *local* value of Hay instead of the *intrinsic*, would have caused an erroneous estimate of all the Crops in every Course of which Hay makes a part. It will be seen by inspection, that many parts of the subject are involved in each other in an extremely intricate manner, and that it was necessary in some cases to clothe a mere theory in figures, to make the whole assume a systematic and regular shape; in which the minute data and the final result have a tendency, either to correct each other, or to prove the fallacy of the theory and the calculations. The difficult nature of the subject, is the only plea that can be offered for the occasional errors and deficiencies that may be met with.

It will be obvious that other kinds of Tables are necessary, to illustrate various collateral subjects, but which could not be attended to in the present instance. Indeed, so little progress has been made in this department of Agricultural Science, that many Tables have been made, altered, and rejected, before the whole assumed its present shape; the previous attempts having answered no other purpose than to point out the
various

various sources of error, and the necessity of a minute subdivision of the subject.

The method which I have adopted is, in many respects, different from such as have been hitherto laid before the public ; yet I have not deviated from other calculators, in any thing which did not appear to me essentially necessary.

December, 1807.

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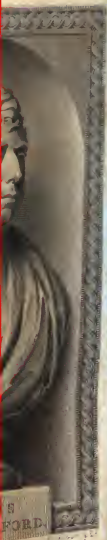
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"To contribute to the welfare of his fellow Citizens, was the constant unremitting pursuit of his life: by his example, and his beneficence, to render them better, wiser, and happier"

From the MSS. of the Duke of Bedford, in the possession of the Duke of Bedford.



Dr. W. C. C. was the
by his example and
mentor, and happy



mile, it appears to contain 297,600 acres, or 465 square miles.

The shape of the county is a very irregular parallelogram, much indented at the circumference with parts nearly insulated or detached, as is the case with several other counties. The greatest length, according to the map by Jefferys, is about 36 miles, and the greatest width about 22 miles.

SECT. II.—DIVISIONS.

In the Abstract of Returns relative to the Expense and Maintenance of the Poor for the year 1802, &c. the county is divided into five divisions; the names of the hundreds in each division, and the number of parishes in each hundred, are as follow :

First Division.

	<i>Parishes.</i>
Barford hundred,	8
Stodden hundred,	14
Willey hundred,	18

Second Division.

Biggleswade hundred,	14
Clifton hundred,	9
Wixamtree hundred,	7

Third Division.

Manshead hundred,	29
-------------------------	----

Fourth Division.

Redbornestoke hundred,	14
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Fifth

Fifth Division.

	<i>Parishes.</i>
Flitt hundred,	12
Bedford town,	5

The number of parishes as above, appears to be 125; but Mr. Lysons, in his *Magna Britannia*, states the present number at 121; and Wolsey's List, quoted by Camden, makes the number of parishes only 116.

The ecclesiastical divisions are stated by Mr. Lysons nearly as follows: "This county, which lies within the diocese of Lincoln, is under the jurisdiction of an Archdeacon, and is divided into six Deaneries, viz. Bedford, Clapham, Dunstable, Eaton, Fleete; and Shefford. Several of the benefices are consolidated, as Aspley Guise with Husbourn Crawley, Astwick with Arlesey, Barford with Roxton, Battlesden with Potsgrove, Chalgrave with Hockliffe, Felmersham with Pavenham, Hulcot with Salford, Knotting with Soul-dron, and Southill with Old Warden. The parishes, nevertheless, remain distinct. Some of the consolidations are of recent date. Shefford is a chapel of ease to Campton; Silsoe to Flitton; Billington, Egginton, Heath, and Reach, and Stanbridge, are all chapels of ease to Leighton Buzzard. Of the 121 parishes, 63 are Vicarages; the great tithes of these, with very few exceptions, were formerly appropriated to religious houses, and are now in lay hands."

SECT. III.—CLIMATE.

In the original Report, the climate is said to be
 "mild and genial, and favourable to the growth of
 corn

corn or vegetables;" but in a district far removed on all sides from the ocean, and which is not affected by the presence or contiguity of fenny or mountainous districts, it will not be supposed that any peculiarities of climate may furnish matter for particular observation. Soils which are cold in nature, as well as those in elevated and exposed situations, are commonly observed to be late in bringing corn to maturity.

In the former class may be included much of the county north of Bedford; and in the latter, the greatest part of the southerly or chalky district. The chalky soil is, however, considered as of a cold quality, independent of its general elevation.

The most prevalent winds, as far as observation has been made, are those from the south-west; these are very general in summer, and not unfrequent in winter; while those from the north-easterly points are usually regarded as both a sign and cause of a cold ungenial season in summer, and of frost and snow in winter.

SECT. IV.—SOIL AND SURFACE.

"EVERY soil, and every mixture of soil, commonly seen on high land in the united kingdoms, may be found in this county, from the strongest clay to the lightest sand."

The various kinds of soil are frequently found in such small portions, and so much surrounded and intermixed with each other, that no very accurate delineation of them can be made; but as much accuracy as the subject admits of, will probably be found in the Map which accompanies this Survey.

The

The sandy district, which extends, with a small interval, from Leighton to Potton, is in length about 25 miles; the general width is about three miles, but it varies from five miles to one, as between Woburn and Leighton, where it extends several miles into the county of Buckingham. Very little sand is to be met with in any part of the county beyond the boundaries marked in the Map, which appears to occupy about 42,000 acres. This sandy belt, as it has been termed, mostly presents a hilly surface, with clay and various loams in the intervening vales, and sometimes clay on the tops of the hills. If to these be added the ferruginous peats of Tingrith, Fletwick, Westoning, Flitton, Maulden, &c. it is probable that the real quantity of sand may be found not to exceed 30,000 acres.

The sands of this county vary considerably in value; many parts are too hilly to afford any profitable prospect of arable cultivation; and in others, the clay or marl, which is necessary to their improvement, is found only at inconvenient distances. Much has, however, been done towards the improvement of this district, in which four parishes only remain in an unenclosed state. The colour of the sand is in general a brownish yellow, which colour is known to proceed from the iron, either combined with, or loosely adhering to, its surface.

In some places the sand is of a greyish appearance, from a mixture of the black and white kinds in various proportions. The white sand is by some termed a *silver silt*, a small quantity of which may sometimes be observed intermixed with the yellow kind, and in grains much larger than the common sort. The herbage produced by the black and white sands, consists almost entirely of heath (*erica vulgaris*), or ling, as it is generally named in this county; and the quantity of

intermixed fern (*pteris aquilina*), or natural grasses, is always inconsiderable.

The common yellow sand has been described as consisting of "small round pieces of flint, or *silex*, blended with poisonous particles of iron." But the poisonous quality here ascribed to iron, has surely been adopted from loose and superficial theory.

The presence or absence of this metal, appears to constitute the principal characteristic distinction of the yellow, or grey sands. The invariable barrenness of the latter would, therefore, warrant a conclusion directly opposite to that contained in the above quotation. Sand may owe much of its natural fertility to iron, though some clays have been known to contain so much of it, though possibly combined with some other mineral, as to prove insuperably barren.

The most powerful medicines, when improperly used, become the most violent poisons.

The parish of Sandy, is generally supposed to contain the best garden ground in the county. The prevailing soil of the parish has been described as "a rich sand two or three feet deep." But this description, if true, must only be understood of some of the low, flat vales, which, like all others in the same circumstances, have received all that the rains, &c. could dissolve and carry away from the hills for many centuries.

The sand in some parts of the heath in this parish, evidently consists of smaller grains than such as compose the bulk of the sands of Liddington, &c. which is a circumstance sufficient to account for their superior natural fertility.

The district consisting principally of chalk, which is bounded toward the north by the Chiltern hills, contains about 36,000 acres, among which perhaps 4000
acres

acres of those elevated tracts, known by the names of Dunstable-downs, Luton-downs, Warden white-hills, &c. may be considered as almost in a state of nature. In the angle of the county which contains Whipsnade, &c. "the prevailing soil is chalk, having a stratum of flint a foot beneath the surface, of half a foot thickness, to which stratum succeeds clay of various depths, from six to ten feet, which terminates in chalk."

Some of the hills at Luton, are clay toward their summits, with chalk and gravel descending to the vales; and at Sundon, and Streatley, we find the chalky basis covered to various depths by a stratum of clay, gravel, or gravelly loams.

Among the towns included principally in this district, two are enclosed, viz. Sundon and Houghton Regis, with a part of two or three other parishes. The Chiltern hills are the outcrop of the chalky stratum, which passes under the whole county of Hertford, &c.

The principal part of the gravelly loams found in this county, follow the course of the rivers Ivel and Ouse, and comprise a space of about 34,000 acres.

A considerable quantity of clay is however included within the boundaries marked in the Map, but it is probable that the insulated spots of gravel which are met with in other parts of the county, may make the total quantity of soil which is more or less gravelly, nearly equal to the above statement. The meadows of the Ouse and Ivel, consist of gravels of various degrees of fineness, mixed with clay and sand, composing loams of several descriptions. Gravels are also found beyond the district marked in the Map, and frequently appear in the slopes of the hills which attend the meandering course of the Ouse from Turvey to Bletsoe.

The last mentioned district is also distinguished by a stratum of flat, hard limestone, which is thus described by the late Mr. Cooper. "The usual strata on opening a pit are these: good earth two feet more or less; a light-coloured marl, which soon incorporates itself with the mortar, under which is a small stone, short, thick, and hard, called the pendle rock; under this sometimes a thin washy mortar, then again pendle rock, under which lies the solid rock; this is sometimes twelve feet below the surface. There are frequently in the rock, veins of bluish stone. Under the rock is penny-earth, used for malting floors, barn floors, &c."

The limestone, though sometimes appearing on the surface, is, so far as the cultivation of the soil is concerned, too inconsiderable to deserve a distinction in the Map.

It is difficult to determine whether the greatest part of Campton, with Shefford, and Biggleswade, ought to be included in the district of sand or that of gravel. The soil of these parishes consists of various loams, &c. and Biggleswade excepted, very little of the gravelly district remains in the open-field state. The following observations on the gravels, &c. are from the pen of Mr. Foster, of Bedford. "South of the Ouse the gravels may be said to extend nearly across the county, though in some parts west of Bedford, the clays protrude to the very edge of the river. The gravelly district is narrow towards the west, then expands more and more towards the east, occupying a breadth of from one to five or six miles. In some places, as part of Kempston, Elstow, Fenlake, towards Biggleswade, Wyberston, and Eaton, the subsoil of gravel is covered with a great thickness of black mould, or red-brown earth,

earth, and in both of them the fertility is very great, every sort of corn or seeds never failing to yield an ample crop. In other parts, particularly about Wilt-
linton, the gravel is too near the surface, and the upper soil is too sharp, the consequence of which is, that while it is well adapted to all the products of light land, it will rarely bear a very heavy crop of wheat, never beans, and will not support permanent grass without being constantly supplied with dung. Though these gravels are in general dry, yet in some places, copious springs, which never fail in summer, break out, and unless carried off by deep under-drains, are very injurious, as far as their effects reach.

“ The parts immediately joining the river, over which annual inundations extend, are every where occupied by meadows. Where there is a gravelly bottom, and where they are sufficiently elevated above the bed of the river to lie dry in times when the waters are not out, they are of unwearied fertility, producing every year abundant hay-crops and after-grass, without the aid of any manure. But where they are too near the level of the water, which is injuriously to them upheld by the mill-dams, or in those few places where the soil is clayey, the grass they produce, though plentiful, is of a coarse and rushy nature, and they lie during spring in a wet and spongy state, without any adequate means of remedy. These meadows are inundated in the course of every winter, floods at hay time have been known, but are uncommon, for the river having a long course, and gentle stream, is not easily affected by sudden summer rains. North of the river is also some gravel, but it no where extends to any considerable breadth. Between this and the rising country is in most places a mile or more of deep black
mould,

mould, or rich brown earth upon a bottom of mild clay, forming a most excellent soil, capable of bearing every crop from turnips to beans, in great perfection, with common husbandry, unaided by artificial improvements."

By a reference to Sect. 1. it will be seen that the remaining part of the county, consisting of clays of every description, comprises about two-thirds of the whole, or 197,600 acres. The clays of the southern part of the county, extend without interruption from Billington to Cockayne Hatley.

They are mostly stiff and tenacious, interspersed with small portions of gravels, and loams on a wet basis. The clays near the Chiltern hills, contain in general a mixture of chalk, and are therefore called white land, though it appears the term *maumy* or *marme*, is used in some parts, to designate soils of this description.

The clays of the central district occupy the southern part of the Vale of Bedford, in which but little gravel appears on the surface, though it is found at various depths in some parts of Marston, Houghton Regis, &c. The general flat surface of the Vale, is in this and most other instances, an indication that the soil is not infertile, and perhaps no other part of the county contains an equal extent of clays, which is not of inferior fertility. The Vale of Bedford is bounded by a range of hills, which toward the east and south divide it from the sandy belt which crosses the county. The soil of much of this tract is denominated *woodland*, and woods occupy much of its surface. The term *woodland*, except when it means land covered with wood, does not occur in several of the County Reports, or other Treatises on Agriculture, though there can be

no doubt that the same kind of soil is common in many parts of this country.

There are several varieties of this soil, but as it generally occurs on the summits and declivities of the hills, the staple is mostly shallow, and the subsoil is either a blue or yellow *golt* clay, or a marl abounding with chalkstones of various degrees of friability. The surface soil is generally a light spongy clay, which does not derive its friability from a mixture of sand, nor perhaps often from chalk or the remains of putrefied vegetables.

As this kind of soil is commonly in the vicinity of woods, it is probable, and indeed certain, that in the early stages of cultivation, such hilly clays were neglected, as proper for little else than the growth of wood, and some of them which have been long reclaimed from a state of nature, produce little, if any, profit to the occupier.

The north western part of the county possesses many points of similarity to the district last described; in both of these hilly divisions, we frequently meet with cold, thin stapled clays, which are sometimes so tenacious as to "hold water like a dish."

In other instances they are light and marly, permitting the feet to sink deep into them in winter. At Harrold, Mr. Pickering describes some of the soil as consisting of clay, which, when slightly wetted, is as sticky as glue, intermixed with many white stones which are a kind of limestone gravel. The woodlands, though often of a blackish colour, are sometimes, as in a part of Old Warden, described as of a pale red, or a kind of orange colour. On the declivities of the hills, as near Marston Thrift, the furrows are sometimes "washed away, and the light stones driven in heaps by heavy

heavy rains ;" and in many instances, the winter frosts are described as rendering this kind of soil "as porous as a honeycomb."

"From near Bedford to the northern extremity of the county, the face of the country is pretty uniform, consisting of, first, eminences and moderate hills of brownish clay, more fertile when mixed with chalk-stones, and of a colour inclining to the red ; but sterile and stubborn when *golly*, and of a blue or yellow cast ; also upon the steeper slopes, where the mould has been from time to time washed into the flats. Secondly, are vallies, which following the course of the brooks, increase in breadth, of which the principal one commences about Risely, and proceeds through the parishes of Swineshead, Pertenhall, and Little Staughton. Here there is a gravel bottom, covered with an ample thickness of black mould, or other good soil. Thirdly, those parts which are upon high ground, and yet have little or no descent, are frequently what are denominated woodlands, or hen-mould earth ; they are composed of a clay, which in the subsoil is yellow, close, and wet ; but when exposed to the surface, and cultivated, turn to a black and very light mould, dirty in wet weather, but when dry, particularly in the spring, extremely loose and dusty.

"This soil is very deceptive to those who are unacquainted with it : its black colour and friability gives it the appearance of fine mould, while its properties are such, as generally to keep its cultivators poor. If ploughed, it becomes so loose in March, that the frosts uplift and bare the roots of wheat and clover ; while the dry winds that intervene, blow away the earth from the fibres which still had hold, so as often to render it necessary to plough them up. Both winter and
spring

spring corn, which always come up luxuriantly, turn yellow and sickly in May, particularly if the season be wet, while innumerable annual weeds almost choke the remaining weak plants.

“ Yet sometimes, if the spring be dry, woodlands bear good beans; and fair wheat and barley are sometimes, though rarely, seen.

“ This soil is also productive of the worst of grasses; so coarse, that most part remains untouched by the cattle all winter. The furrows are spongy and poached all that season and spring, while ant-hills take possession of a great share of the remaining surface.”—*J. Foster, Esq.*

SECT. V.—MINERALS.

UNDER the head of Minerals, little occurs that will be deemed worthy of particular observation.

A small quantity of ironstone has been observed in some pits at Brouham, and some of the strata in the sand-pits of Lidlington, &c. contain much of this metal. Gold, it is said, was formerly discovered at Pulloxhill, but the tradition (according to Mr. Lysons) rests on questionable authority.

“ The greater part of the extraneous fossils which occur in this county, are found in the stratum of limestone which follows the course of the river Ouse,” from Turvey to Bedford. “ This stratum abounds with the different kinds of shells, and other marine productions, which are commonly found imbedded in the yellow limestone. *Cornua Ammonis*, and other kinds of shells, are found in the stratum of stone in the Totternhoe

hoc quarries, which lies above that used for building; and great abundance of petrified wood, together with *gryphites*, *belemnites*, &c. under the stratum of fullers'-earth at Aspley. Petrified wood has been found in other parts of the county, where the soil is sandy." "Woodward mentions *nautili*, and other shells, as found in a chalk-pit at Cuddington; *shark's teeth*, *ammonites*, *belemnites*; &c. in a light-coloured clay near Leighton; and *echini* in the fields near Eaton Bray." The fullers'-earth said in the above extract from Mr. Lysons to be found in Aspley, is, as I am informed, in the parish of Wavendon, and therefore beyond the boundaries of Bedfordshire: it is worth, I believe, 6d. per bushel at the pit, and 1s. at Bedford.

Small quantities of imperfect coal have been found in the parish of Goldington, and it is said some signs of this substance have been discovered in other places; but it is said that the usual disposition of the strata of the earth, gives no reason to expect coal of any value to be found in this county.

Some of the limestone of Pavenham has been used formerly for grave-stones, and some churches have been floored with it; but a better or cheaper kind of stone, found at Halston and Dussong, in Northamptonshire, has superseded the use of it.

Many church porches were built with the freestone of Totternhoe, and it is said, a block of 40 tons weight has been raised in those quarries.

Clunch is one of the names of this kind of limestone; but the hard chalk which lies near the surface of the hills, and is used at Ampthill, Husborn Crawley, &c. for lime, is usually known by the name of *hurlock*.

SECT. VI.—WATER.

“THE principal river is the Ouse, which runs across the county from the Buckinghamshire side, through the town of Bedford, to St. Neot’s, in Huntingdonshire.” The Ivel, which first assumes the name of a river about Clophill, passes by Biggleswade, and joins the Ouse at Tempsford; besides which rivers, the Lea, at Luton, may be mentioned.

There are several mineral springs in the county, but none of them have obtained much celebrity. Dr. Yeats analyzed the water from Clapham, Wrest-gardens, Bromham, Oakley, and Turvey. “The two first evidently contain iron. In the Wrest water, iron appears to be held in solution by the carbonic acid; in the Clapham water, by the vitriolic acid, forming the *ferrum vitriolatum*: both of them contain also the *sulphate* and *muriate of lime*, as likewise the *sulphate of magnesia*, or Epsom salts. The Bromham water contains no iron, but holds in solution the different salts just mentioned, the muriate of lime being in considerable quantity. The spring at Turvey contains a very large proportion of lime, held in solution by a superabundance of carbonic acid.” There are several other mineral springs, as about Holcut and Cranfield; they appear to be lightly impregnated with iron, and are sometimes used for the cure of sore eyes, &c. One of these springs, in the latter parish, is known by the name of Holywell, which seems to imply, that it was at some early period held in high estimation.

CHAP. II.

STATE OF PROPERTY.

SECT. I.—ESTATES, AND THEIR MANAGEMENT.

MR. LYSONS had observed, in his late publication, that "The estates of the Duke of Bedford now form what may be considered as by far the largest landed property in the county;" but this, Mr. Belsham remarks, is not perfectly correct. "The Duke of Bedford is certainly the principal landed proprietor, but Lord St. John and Mr. Whitbread are not very far inferior to him. Their united possessions in the county, of which the rental is, however, in proportion to the extent, very large (not less, it is supposed, than 300,000*l.* per annum), are estimated at more than 40,000*l.* yearly value, and are probably little inferior to those of any other ten proprietors." "The Marquis of Bute, the Earl of Ossory, Lord Hampden, Lady Lucas, Sir P. Monoux, Sir G. Osborne, and Mr. Pym, rank high in the second class."

The following tables exhibit a list of the principal proprietors, with the parishes in which their largest estates are situated. It will not be expected that such a table can be very complete, or even correct, in all cases,

Proprie-

<i>Proprietors.</i>	<i>Parishes.</i>	<i>Proprietors.</i>	<i>Parishes.</i>
The Duke of Bedford,	Woburn, Knotting, Souldrop, Oakley, Cople, Willington, Eaton Socon, Bedford, Clapham, Goldington, Risely, Thurleigh, Stepingley, Ridgmount, Aspley, Crawley, Eversholt, Flitwick, Houghton Regis, Lidlington, Maulden, Potsgrave, Wilden, Milton Bryan Ravensden.	Lord Hampden, Lady Lucas, Sir P. Monoux, Sir G. Osborne, T. Pyth, Esq. Lord Ongley, Lord Carteret, — Thornton, Esq. Rev. Thos. Leigh, — Polhill, Esq. Montague Burgoyne, Esq. Sir Gregory P. O. Turner, Lord Ashburnham, G. Brooke, Esq.	Bromham, Stagsden, Biddenham, Stevington. Silsoe, Gravenhursts, Stondon, Clophill, Flitton, Higham Gobian, Harrold, Pulloxhill. Sandy, Wootton, Eversholt. Chicksands, Campton cum Shefford. Sandy. Warden. Hawnes, Willshamstead. Muggerhanger, Everton. Leighton, and its hamlets. Renhold. Sutton. Battlesden, Potsgrave, Hockliffe, Milton Bryan, Clapham, Bedford. Flitwick, Maulden.

Lord St. John,

S. Whitbread, Esq.

Marquis of Bute,

Earl of Ossory,

BEDS.]

C

Proprie-

<i>Proprietors.</i>	<i>Parishes.</i>	<i>Proprietors.</i>	<i>Parishes.</i>
T. Alston, Esq.	Odell.	J. Higgins, Esq.	Turvey.
J.W. Jennings, Esq.	Harlington.	W. Long, Esq.	Kempston.
J. Miller, Esq.	Dunstable.	R. Dennis, Esq.	Kempston.
— Cooper, Esq.	Taddington.	— Gibbard, Esq.	Sharnbrook.
G. Edwards, Esq.	Henlow.	J. Foster, Esq.	Bedford,
Dr. Macqueen,	Ridgmount,		Marston.
	Houghton,	E. H. Delmè Rat-	
	Langford,	cliffe, Esq.	Ridgmount.
	Felmersham.	— Partridge, Esq.	Cranfield.
J. Crawley, Esq.	Stockwood in	— Barnet, Esq.	Biggleswade.
	Luton.	— Metcalfe, Esq.	Roston.
Sir Hugh Inglis,	Milton Bryan.	Sir J. Buchanan	
Lee Antonie, Esq.	Colworth.	Riddel,	Sundon.
Rob. Trevor, Esq.	Tingreth.	Queen's College,	
— Young, Esq.	Barton.	Cambridge,	Clapham.
— Brandreth, Esq.	Houghton Regis.	Rev. Orlebar Smith,	Holcut,
Earl Spencer,	Marston,		Aspley.
	Lidlington,	Bishop of Lincoln,	Wilden.
	Dunton.	Rev. Selby Hele,	Colmworth.
Earl of Peterbo-		C. Tower, Esq.	Houghton Regis.
rough,	Turvey.	— Orlebar, Esq.	Puddington.

The management of estates affords little ground for observation : they are sometimes committed to the care of attornies, or land-agents ; but the estates of some of the principal proprietors are superintended by such as are themselves considerable farmers.

SECT. II.—TENURES.

COPYHOLD estates are numerous in some parishes, but nothing occurs respecting them that is worthy of particular detail.

CHAP. III.

BUILDINGS.

SECT. I.—HOUSES OF PROPRIETORS.

“THESE, as in most other parts of this island, are not unsuitable to the respective rank and property of their inhabitants.”

SECT. II.—FARM-HOUSES AND OFFICES.

THERE are several farm-houses in the county, that were formerly the seats of gentlemen who appear to have farmed their own estates; and there seems much reason to believe, that this class of proprietors is considerably diminished since the commencement of the last century. The farm-houses are generally situated on low ground, by the sides of public and other roads; in consequence of which, the drainings of the dung-yard are washed away by the rains, without any possibility, in most cases, of applying it to the use of irrigating the pasture land. The buildings, which have been erected at various times, and enlarged or diminished as occasions offered, are often inconveniently situated, and are seldom found at the centre of the farm to which they belong. It appears, however, that the practical inconvenience of removing the house and

c 2
buildings

buildings belonging to a large farm, is generally deemed of more consequence than the extra trouble and expense of occupying lands at a great distance, as the farm-houses which have been rebuilt commonly occupy their former positions,

The late Duke of Bedford erected a new farm-house at Eaton Socon, of an octagonal form (*Plate I.*). It was designed by Mr. R. Salmon, as bearing an advantageous comparison, in point of strength and cheapness, with a house of the usual square form, and of equal area (*Plate II.*). The estimated expense of each mode of building was as follows :

The octagonal plan, £.671 8 8

The square plan, 733 0 0

The farm-houses and buildings are generally kept in repair by the landlords, except in a few cases, where the farms are left at an old rent, and the tenants are required to pay the expense of workmanship.

In some cases, the tenant is permitted to employ a carpenter, bricklayer, or thatcher, for a few days occasionally, the expense of whom is again reimbursed by the landlord.

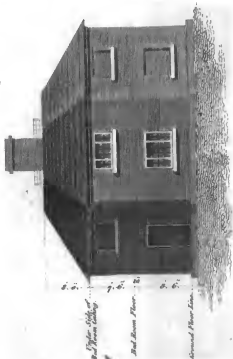
The average value of the buildings on a farm of 200 or 300 acres, is stated by Mr. Platt, of Liddington, at about five years' rent.

SECT. III.—COTTAGES.

THE cottages of this county consist of two, three, and four rooms, and it is probable that about three rooms, on the average, are inhabited by each family. They have, in general, a small piece of ground attached to



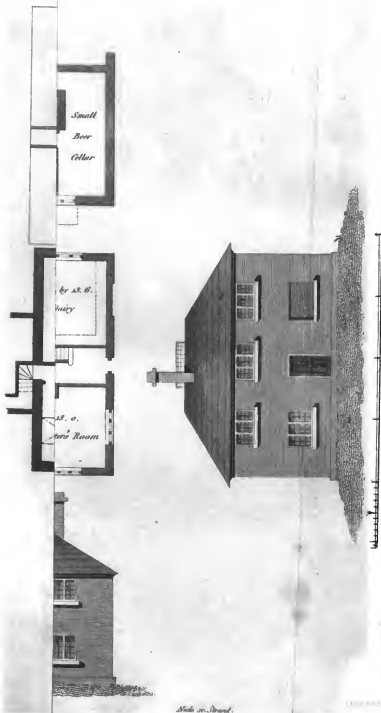
Water Ground.
Common Kitchen



This Plan. Sq. Plan.
Area Equal
Circumference of Walls 128.0. 146.0.

Note on Ground







to them as a garden, which frequently does not exceed sixteen square poles, or one-tenth. of an acre to each cottage. The rents vary from 26*s.* to 50*s.* or more, and perhaps the average may be about 35*s.* per annum. In the lime-stone district, west of Bedford, the cottages, and most kinds of buildings, are composed of stone, and even the chimnies are sometimes built with that material.

In the north-east of the county, the cottages and barns, and even some of the farm-houses, are built with wood frame work, and clay plaster upon a kind of hedge work of splints, which is called *wattle and dab*. The chimnies of the cottages are frequently composed of the same materials, and the barns are seldom covered with elm boards, which is the common practice in the south of the county, where also it may be observed, that bricks and tiles are in more common use.

Pisé Building.

The observations which are inserted under this head, are extracted from the Annals of Agriculture, vol. xxxix. No. 227, where Mr. Young has given a detailed account of the husbandry of His Grace the late Duke of Bedford, containing many important particulars, which the writer of these pages could not derive from any other source.

“ The earth walls which are common in Ireland and Devonshire, consist of mud and straw kneaded together, and worked into a wall, which is raised in layers of three or four feet, and are left to dry before any additions are made; but another, and much better mode, has been used in some parts of France for centuries; and which consists of loam prepared by breaking it small, and which, without any mixture of either straw or

water, is rammed into caisson frames, moveable, but bolted together to contain earth to the breadth of the intended wall. The frames are five or six feet long, and two feet deep, or any other dimension which may be found most convenient. The best earth is a good friable loam containing much sand, but any earth will do, except clay and running sand.

“ This is rammed dry into the frames, which are then moved on and filled again, without waiting, as is the case of common mud-walls, for drying.

“ In France, these walls are made high enough to contain two or three stories, and have stood firm for above two hundred years.

“ The Duke of Bedford was desirous of making an experiment on this mode of building, and executed it in a manner very satisfactory. He began with two walls and small lodges; and his master of the works conceiving that lime, in a small quantity, added to the earth, would be an improvement, one wall was so built, and the other with earth only.

“ The result has confirmed the theory; the wall to which lime in the surface was added, does not peel, but the other does. His Grace is now building a very good house for the master of the works, in this method, under his own inspection: this also has a mixture of lime in the earth, which is on the external surface: one part slaked lime to three parts of earth, only to the thickness of about an inch. It does not answer when laid on as plastering, as it will not adhere, but must be mixed with the earth, while putting into the caisson frames. The addition of lime increases the expense only $1\frac{1}{4}d.$ a square yard. The men form the wall by contract at $1s. 6d.$ per square yard, but the earth is brought to the building for their use.

“ In

“ In any situation 2s. a yard would do the whole, at fourteen inches thick ; and brick would be 7s. a yard, or 10*l.* 10s. a rod.

“ The earth that was used being near the spot, the actual expense of these walls, with the exception of the white-washing, was no more than 17½*d.* per yard.

On Pisé Walling, at the Master of the Works' House, Woburn Park.

February 3, 1798.

“ The pisé wall amounted to 170 yards, 16 inches thick, the expense of which was 24*l.* 16s. 3*d.* or 2s. 11*d.* per yard ; but it was conceived, that more lime and labour were used than would be required if the work was well understood, and regard had to the use of the facing stuff.

“ The expense of the common sort of pisé walling for cottages, or walls not above 10 feet high, the outside lime-whited over :

Sixteen inch earth walling, including } digging earth, if on the spot, per yard, }	£. 0 1 8
Stopping the holes, and lime-whiting the } outside, materials 1 <i>d.</i> labour 1 <i>d.</i> }	0 0 2
Interest and use of molds,	0 0 1
Total cost of one yard,	0 1 11
The second sort, for better cottages,	0 2 5
Third sort, for farm-houses,	0 2 9
Fourth sort, for best farm-houses,	0 3 0
A brick wall of the above thickness, with- out lime-white, or any facing, would at } Woburn cost per yard, }	0 8 6
If stuccoed, and made equal in appearance } to the above,	0 10 0

“ This mode of building deserves great attention, particularly from those who wish to build cottages; for nothing makes such warm, dry, comfortable houses, and, if white-washed, they are as ornamental as if built of any other materials.

“ Nothing can be more in contrast to the warmth of such habitations, than the plaster walls, whether of mortar or clay, which are common in the eastern countries, through which the wind blows, to the misery of the poor inhabitants.

“ The substitution of pisé walls would add very greatly to the comfort of the poor in those countries, and, at the same time, cost less than the wretched materials used at present.”

I have no means of ascertaining the present expense of pisé walling, but it has probably experienced a rise equal to that of most other kinds of workmanship in the last ten years.

CHAP. IV.

OCCUPATION.

SECT. I.—SIZE OF FARMS.

IT does not appear that a consolidation of farms has taken place in this county, to the extent in which it is said to have been practised in several districts of Great Britain; but it is evident that the prevalence of the enclosing system, and other causes, have diminished the number of farms within the last fifty years to a considerable amount. By the assessment made for the relief of the poor of Liddington, in the year 1758, it appears that the three largest farms were assessed after the rate of 156*l.* 184*l.* and 204*l.* per annum, and as the rent of the parish is something more than 1*l.* per acre, and has been more than doubled within that period, it may be presumed that the above-mentioned farms contained from 250 to 350 acres each.

Very few of the other farms exceeded 100 acres.

Fifty-eight resident families were assessed to the relief of the poor, but the occupations of twenty-two of them were trivial, and did not exceed 3*l.* per acre.

The number of those who might with some propriety be called farmers, amounted therefore to thirty-six, and an equal division of the parish among these, deducting fifty-two acres for cottages, &c. makes the average size of farms 68 acres. It appears also, that there were about fifty proprietors of houses and lands,
and

and the poor's rate at 3*d.* in the pound, amounted to 16*l.* 10*s.*

In the assessment of 1765, there appears to be fifty resident families assessed to the relief of the poor; there were thirty-six farmers as before, but the small occupiers were diminished from twenty-two to fourteen, and the threepenny rate had been raised to 20*l.* 11*s.* 9*d.* The present state of the parish, as nearly as can be collected from the poor's rate and other sources, is as follows:

	<i>Rent.</i>	<i>No. of Farms.</i>
From £. 2	to £. 5	10
5	— 30	4
30	— 60	6
60	— 100	4
100	— 200	7
200	— 300	3
300	— 600	1
Acres in the parish,		2500
Average farms above 5 <i>l.</i> per annum,		100
Probable rent of the parish,	£. 2835	0 0
Regulated threepenny rate would be about,	35	9 0
Number of proprietors,		35
Population, according to the enumeration of 1801,		559
The population in 1758, on the authority of the		341
baptisms, nearly as 18 is to 11,		
The population of the occupiers in 1758, or		267
4 $\frac{6}{18}$ in each family,		
Subject to become paupers in 1758,		74
The population of the occupiers of land in		161
1807, consisting of 4 $\frac{6}{18}$ in each family,		
The remainder of the population, who are con-		398
sequently subject to become paupers,		
The		

The greatest number of large farms are in the southern and central part of the county. Much of the district north of the Ouse, is a poor clay soil, which affords no great temptation to opulent farmers; small occupations are therefore more numerous in that part of the county; and according to the representation of a gentleman in that neighbourhood, several of the farmers have been formerly menial servants, and have obtained their situations by persevering industry and economy. There are, however, many large farms in almost every part of the county, some of which are as high as 700*l.* or 800*l.* per annum, and there are not any considerable number of parishes that do not contain one or more farms from 200 to 500 acres. It has been said, that the farms of His Grace the Duke of Bedford are not larger on the average than 80 acres, but if this assertion be correct, it must include, in all probability, such small occupations as five or ten acres; several of which may be rented by farmers whose principal farm belongs to some other proprietor. The farms of Liddington have been stated at 100 acres each, exclusive only of the cottages, but there are probably more small farmers in this parish than in many others, notwithstanding a decrease of more than one-third in half a century.

If the cottage allotments, which seldom exceed two acres, be excluded, it seems probable that all the other farms in the county may amount on the average to 150 acres each, a size which forms what is properly deemed a moderate farm among the great body of farmers in Bedfordshire.

According to Mr. Farey's table of crops, &c. (see *Course of Crops*) the Duke of Bedford's farms are not much smaller than the average size; but Mr. Farey
excluded

excluded some occupations which are larger than cottages.

SECT. II.—FARMERS.

MR. FOSTER'S general remarks upon the husbandry of Bedfordshire, are as follow: "This county possesses most diversities of soils. Part of the sands and of the clays, particularly about Wootton and Marston, and all the black earths (near Bedford), are naturally so rich as hardly to be exceeded, and taking the county throughout, it is of at least average fertility. To say the same of the state of our husbandry, would be too much. Very considerable fields remain in the common open-field culture, and in many new enclosures, no great advantage is yet visible.

"The most ordinary sorts of tools, particularly of ploughs, are in general use; and the mode of ploughing with two horses a-breast, has been adopted by comparatively but few. The grass lands, except near the towns, or close to the farm-houses, are neglected and exhausted. At the same time, however, it affords great satisfaction to observe, that much has been done in various ways toward general improvement, and much more is shortly to be expected.

"The benefits of enclosures are, in some parishes, already conspicuous, and are every where in preparation. The roads are in most places becoming good, particularly where the use of stones has been rejected, and that of gravel adopted. Great things have been done, and are now doing, in drying the land by deep ditches, by under-furrow and plough draining. The
breed

breed of sheep is amazingly altered for the better, and some of the best Leicesters have found their way hither, and are becoming yearly more common, particularly in the north and east (of the district north of the river Ouse). Some are in possession of the most improved tools, and every year there are new converts to the system of ploughing with two horses. Emulation is excited, and knowledge diffused, by the annual meetings at Woburn, and by the Agricultural Society at Bedford, founded by him to whom we justly look up as the author and patron of all our rural improvements—the late Duke of Bedford; a character in whom every moral, social, and political virtue were united; whose transcendent abilities, and amiable qualifications, were the object of the admiration, not only of his friends and countrymen, but even of our national enemies.

“As long as our county enjoyed the presence of his illustrious successor, the great bereavement sustained by this loss was indeed well supplied.

“Now that we have to regret the temporary absence of the present Duke, we are consoled in the assurance, that a more extensive portion of the British empire reaps the benefits which his benevolent mind, benign influence, and conciliating manners, cannot fail to dispense, converting mistrust into confidence, mutual animosity into general harmony, treason into loyalty, oppression and poverty into increasing welfare and opulence.

“The town of Bedford, and its neighbourhood, also attest the liberality of the late and present Mr. Whitbread. While the comprehensive faculties of this respectable senator are continually engaged with the more
general

general and leading objects of concern in the British dominions, with our external relations; financial economy, domestic policy, and national defence; and while his attention is no less directed to the minuter parts, visiting the cottage of the labourer, and protecting the asylum of the pauper and the infirm—our agriculture has also the benefit of some portion of his notice.

“Nor should it be left unmentioned, that the comfortable habitations every where distinguishing the extensive estates that have the good fortune to be owned by him, prove that his care is extended to each individual family.

“Our husbandry is also patronized by Mr. Lee Antonie, and by several other resident noblemen and gentlemen. The effect of their influence and example is not only discernible in our improving culture, but in a more general diffusion of civilization and instruction among all classes. Formerly, in this and other counties, it was with too much reason that the farmers in general were accounted ignorant, obstinate, and high-gardly: now there are to be found among them men of superior information, and of liberal minds, and not very many of the character before described remain. The labouring class are, in general, better maintained than formerly, and there is an emulation among many, to perform their several operations with dexterity. Instances of depravity are every where too frequent; yet it is certain that here, as in other farming counties, there is more morality, sobriety, and regular industry, than where manufactures have been introduced. Much, indeed, yet remains to be done; but we trust the time is not very far distant, when Bedfordshire will yield to no part of England, in the cultivation

vation of its soil, in the excellence of its produce, and in the industry of its inhabitants."

The unwillingness with which the common farmers adopt any new improvement, has been often remarked; yet it cannot be denied, that this reluctance is frequently well founded, as the recommendation of new improvements often comes in a questionable shape. They are told, that two horses a-breast will draw as much as three at length; but who has applied the spring steel-yard, or the dynamometer, to prove the assertion? It is said, that oxen are more profitable as beasts of draught than horses; but whence are they to draw the information of the comparative expense of either? If a small farmer be advised to drill or dibble his beans, he will perhaps inquire what is the most proper distance of the rows, and quantity of seed; or, if dibbled, whether one, two, three, four, or five beans ought to be put into each hole: but these are inquiries that perhaps no agriculturist in Great Britain will venture to answer. In the article of dibbling beans, however, the large farmers of this county will not accuse the small ones of obstinate incredulity, as in several towns in the centre of the county, such as have possessed from one to twenty acres of arable, seem to have been the first who introduced the practice, and several of them have persevered in it for many years. The north of the county, though it contains several large and good farmers, is, on the testimony of the resident gentlemen, less distinguished for enterprise and experiment than any other part of the county. Such as have conducted experiments with a degree of attention which is necessary to render them of any public utility, are aware, that much trouble and some expense attends them; hence it will be readily believed, that the occupiers of small and moderate

moderate farms deposit in their memory all that they wish to preserve of the past, and trust to that too often treacherous guide, the eye, in the valuation of all things present.

The large farmers, though men of liberal minds and considerable experience, freely confess, that the chemical nature of soils, and the first principles of vegetation and animalization, are *desiderata* in agriculture, in the investigation of which, the occupier of 50 or of 1000 acres is almost equally at a loss.

The splendid exertions of the late Duke of Bedford display a scientific character, which has few equals in the history of agriculture. The experiments made under His Grace's order, were directed to ascertain the quantities of hay consumed by working oxen; the comparative food consumed by large and small cattle; the comparative value of turnips, oil-cake, &c. for feeding oxen of the Hereford, Devon, Sussex, and Leicester kinds; accounts of the different breeds of lambs, and trials of what kinds would bear hard usage best, &c.; and it is a subject of regret, that these experiments compose nearly the whole that have been made in this county.

SECT. III.—RENT.

THE rent of lands seems to be invariably paid in money, and, except that the tenants are sometimes required to keep a young fox-hound, &c. for the use of their landlord, personal services are almost unknown. At the middle of the last century, it was common about Lidlington, and probably in other places, to pay half
a year's

a year's rent at the time when a year and a half's rent was become due; but at present, it is customary with some of the principal proprietors, to receive half a year's rent, when it has been due only three months, by which means, it will be perceived, that an additional capital, equal to three-fourths of a year's rent, is necessary to stock a farm, and that the rent is raised *3l. 15s.* per cent. without any alteration in the nominal sum. Of the modern rise of rent in this county, no accurate account can be obtained. In many of the new enclosures the nominal rent has been doubled; in other cases it has been raised 40 or 50 per cent. and sometimes not more than 20 or 30 per cent. There are even a considerable number of cases, under a few indulgent landlords, where the rent has experienced no alteration in 40 or 50 years; and instances are not wanting, of rents which were raised at the end of the last century, that are again increased at the present time.

The circumstances before stated, are sufficient to prove that the rent is not an invariable criterion of the value of the land. The average rent of any particular parish, is frequently as little known to many of the farmers who occupy it as to a person at a distance, as it is a question which would scarcely be asked among neighbours, in a direct way, without giving offence.

The value of the land admits of great variation in the same parish, and frequently on a single farm. In the following notes, such parishes as are subject to tithes are mentioned, and the average of the parish is in general intended; the rent of any particular farm being apparently useless or improper to be specified.

Turvey was *9s. 6d.* now *17s. 6d.* Harrold about *1l.*
 Sharnbrook *16s.* titheable. Felmersham *25s.* Ste-
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vington was 10*s.* titheable; now about 1*l.* per acre. Bromham 17*s.* 25*s.* 30*s.* Biddenham (from 17*s.* to 30*s.* Milton Ernest was 10*s.* 6*d.*; now some 30*s.* and sward at 40*s.*: the average perhaps 1*l.* Knotting 18*s.* titheable. Bletsoe, some of the arable as high as 35*s.* but too dear. Yielding, some as low as 6*s.* or 7*s.* at an old rent. Tillbrook was 7*s.* to 10*s.*; now 1*l.* or more. Melshbourn, sward 45*s.*; arable 25*s.* to 30*s.* Risely, raised by the enclosure from 10*s.* titheable, to 19*s.* Ravensden 14*s.* titheable. Bolnhurst 12*s.*; was formerly 4*s.* 5*s.* or 6*s.* Keysoe 14*s.* Pertenhall, about 1*s.* Little Staughton 10*s.* 14*s.* 23*s.*

The open fields dispersed over the county are in many places about 10*s.* per acre.

Stagsden is stated at about 15*s.* titheable; sward 20*s.* to 30*s.* Cranfield, arable 10*s.*; enclosures 20*s.* titheable. Eversholt, open field, three rood measure, 8*s.* to 10*s.*; the enclosures 17*s.* or 18*s.* titheable. Tingrith 18*s.* titheable. Marston 7*s.* to 27*s.* titheable. Milton Bryan was 9*s.* now 21*s.* and a corn rate. Husbourn Crawley was 6*s.* or 7*s.*; now 20*s.* Holcut 30*s.*; and some as high as 55*s.* Duntun 1*l.* Wrestlingworth 20*s.* to 32*s.* Stotfold 7*s.* to 18*s.* titheable. Langford 14*s.* 6*d.* arable; sward 40*s.* Campton, from 20*s.* to 27*s.* Willington about 20*s.* Sandy, from 10*s.* to 4*l.* or 5*l.* Bedford, pasture 3*l.* or more per acre. Dunstable 30*s.* arable; and some pasture as high as 5*l.* Luton, average 14*s.*; some sward at 3*l.* and more. Woburn 20*s.* 25*s.* &c. for arable, and high prices for the pasture; as is the case near all towns of considerable traffic. Liddington 15*s.* to 3*l.* for some of the pasture. Ridgmount was 7*s.*, now 18*s.* Millbrook, much of the warren qualified from 8*s.* to 10*s.* per acre. Tuddington, arable about 1*l.* Battlesden,

blesden, some of the pasture 3*l*. Potsgrave 25*s*. titheable. Chalgrave and Hockliff 17*s*. to 26*s*. Houghton Regis 1*l*. Arlsey, arable 23*s*.; sward 40*s*. Prislely farm, Flitwick warren sands, 13*s*. or 14*s*.; and the watered meadow at 3*l*. Kempston, pasture at 2*l*.

The mode of letting of land by secret auction, has been lately introduced in one part of the county, and is esteemed to be as illiberal a mode as can be easily invented. A price is not set upon the land, as in all other cases of the exchange of property, but the farmers are required to make what offers they choose, upon which they are generally informed that a greater price has been already offered, but without producing any proof that such is a true statement of the case. It is easy to conceive, that agriculture will not be promoted by secret and mysterious proceedings, which are calculated to destroy the mutual respect and confidence which ought to subsist between a landlord and tenant.

SECT. IV.—TITHES.

ABOUT half the parishes in the county are vicarages, and the great tithes of these are mostly in lay hands. There are but few of the enclosed parishes which remain subject to tithes; and these are mentioned in the account of the enclosures, Chap. VI. The tithe is taken in kind in the parishes of Stagsden, Sharnbrook, Harlington, Stotfold, Egginton, Billington, Tingrith, and a few others.

The amount of compositions for tithe is very variable: in the unenclosed parishes it seems to vary from 2*s*. 6*d*. per acre to 5*s*. Some particular notes that have

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been

been taken are here inserted. Cranfield 4*s.* 6*d.* per acre; Bromham 3*s.* or 4*s.*; Knotting 2*s.* 9*d.*; Carrington 4*s.* 6*d.*; Langford 4*s.* 6*d.*; Stondon 4*s.* 6*d.*; Gravenhurst 3*s.* 6*d.* per small acre; Leighton 3*s.* 3*d.* Dunstable 6*s.* or 7*s.*; Biggleswade 5*s.* 6*d.* for the rectorial tithes; Salford 4*s.*

The tithes of several parishes lately enclosed, are paid by a corn rent, which is regulated by the average price of corn for the 20 years preceding the enclosure, and after a certain number of years is subject to future regulations. The land is generally given to the lord of the manor, and provision is made in the Act for the Clergyman, to take and enter upon the land so allotted for title, in case of non-payment of the corn-rent.

The following extracts from the tithe accounts of the parish of Milton Bryan, in the year 1749, may serve to furnish some idea of the expenses and profits of taking tithes in kind.

Harvest-men, &c.	£.7	4	2
Teams, at 5 <i>s.</i> each,	5	0	0
Overseers, land-tax, &c.	9	14	5
Other work, viz. thrashing, horse hire, and servant man's wages,	} 33 2 9		
	£.55 1 4		

To these expenses must be added the food and ale consumed by the harvest-men, and a servant for the whole year, which would probably make the expense amount to 70*l.* per annum.

The expense of taking the tithe-hay is stated at about 3*l.* 3*s.* exclusive of ale and food which was given occasionally.

Produce.

Produce.

	<i>qrs.</i>	<i>bush.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
Wheat, 85 loads 2 bushels,	53	3	75	18	6
Barley,	43	3	31	5	3
Beans and pease, 72 loads } 1 bushel,	45	1	38	14	0
Beans, 7 loads 1 bushel,	4	4	3	12	6
Pease,	0	4	0	8	0
Oats,	5	0	3	1	6
Thatches or tares, 3 loads } 3 bushels,	2	2	1	16	0
Total amount of tithe corn,	154	1	154	15	9
Total in the whole parish } (840 acres arable),	1540	10	1547	17	6

Other articles of produce:

Chaff sold, 111 fans, at 6 <i>d.</i>	£. 2	15	6
Pea and bean straw, 24 half loads,	6	0	0
Barley straw, 3 parcels,	0	12	0
Wheat straw, 4 loads,	2	0	0
Manure, about 50 loads (1746),	3	10	0
Hay, 20 tons, at 1 <i>l.</i> per ton,	20	0	0
209 lambs, at 2 <i>d.</i> ; 5 tod 6 lb. of wool, at } 15 <i>s.</i> ; and 89 cows, at 4 <i>d.</i>	6	14	8
Total produce of tithes,	196	7	11
The amount of the whole expenses ap- } pears to be about,	74	0	0
Clear value of the tithes per annum,	£. 122	7	11

The value of the tithes at the present time is more than 200*l.* per annum. They were lett in 1661 at 100*l.*

per annum, and in the year 1684 at 90*l.* but it does not appear whether the Rector kept any of the land in his own possession.

From the above it appears, that the expense which attends the taking of tithes in kind, amounts to considerably more than one-third of their value, and as the expense would be considerably less to the farmer, from whose fields they are carried to a great distance, there seems to be mutual reasons why they should never be taken in kind.

There exists much difference of opinion among the clergy themselves on the subject of tithes. Some years ago, a clergyman, since deceased, published objections to almost every species of commutation of tithes, in a letter to the Bishop of Lincoln; and it must be confessed, that inconveniences and losses have occasionally resulted to the clergy, though perhaps in common with other proprietors, in consequence of enclosing. There is, however, reason to believe, that gain has followed that measure more often than loss, but whether a greater or less share of it has fallen to the lot of the clergy, is a subject which, for want of a sufficient number of observations, cannot be here ascertained. A clergyman, in a parish lately enclosed, has lett his vicarage allotment for 70*l.* which previously produced but 30*l.* per annum; yet this gentleman, for various reasons affecting the poor as well as the clergy, retains a dislike to enclosing, and observes, that though he chose to lett the small tithes for about 9*d.* in the pound, or half their value, that does not affect the general question. It may however be presumed to prove, that taking land in lieu of tithes, is a much more eligible and agreeable method of increasing their value, than combating the deep-rooted, because selfish prejudices of their parishioners with the strong arm of the

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the law, and which cannot, in some cases, be otherwise removed. The value of the tithes cannot be estimated at one-tenth of the produce, with a deduction for ordinary expenses, as the law cannot secure the clergyman from a great share of expense, trouble, depredation in the field, &c. to which the farmer is not liable, and which consequently detracts from their theoretical value. In the tithe account of Milton, it may be seen that the produce of the arable land, estimated from that source, was less than two quarters of corn per acre, but I have been assured, by a person who resided there at that period, and knew the practices of *gleaners*, &c. that the produce was considerably greater. In this case there appears no remedy equal to an enclosure; and the interests of morality, religion, and therefore the church and the clergyman himself, are, I conceive, all on the same side of the question. It is extraordinary, if indeed it be true, than any person acquainted with agriculture, should maintain that tithes in kind oppose no obstacles to its improvement.

The value of the tithes is reduced by withdrawing a portion of human labour, thus furnishing an inducement to lay land to grass, which diminishes the support of an increasing population.

On the other hand, the value of the tithes is increased by the addition of labour, and the efforts of ingenuity, to which modern agriculturists conceive that the clergy have no natural right, though they certainly have a legal one. The clergy are injured by laying land to pasture; the enterprising farmer is injured by the tithes, which operate as a direct and heavy tax on his skill and ingenuity.

An equitable commutation of the tithes is extremely desirable, and would conduce to the benefit of all the

parties concerned, and perhaps the allotment of land is a preferable mode, as the revenues of the clergy would then be increased or diminished by the same means and in the same proportions as that of the landed interest in general.

SECT. V.—POOR'S-RATES.

THE general average of the county is not supposed to exceed 3s. 6d. in the pound on the true rent. See Chap. XV, Political Economy, &c,

“ Chief constable's rate of 1d. in the pound :

Barford hundred,	£. 46	1	0
Stodden hundred,	46	1	0
Willey hundred,	61	16	0
Redbournstoke hundred,	79	15	0
Manshead hundred,	124	10	9
Clifton hundred,	36	19	0
Wixamtree hundred,	51	4	0
Flitt hundred,	80	7	0
Biggleswade hundred,	52	19	0

Total, £. 579 12 0”

The Rev. T. O. Marsh.

SECT. VI.—LEASES.

THE farms in this county are in general held only from year to year, or for the usual three years course of cropping, in the unenclosed parishes.

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There are, however, a few farms held on lease in every part of the county; but such leases as have been executed within the last ten or twelve years, are mostly for a short term, as eight, or at most, fourteen years, and some of them are voidable upon half a year's warning from either landlord or tenant.

It does not appear that leases have at any former period been very prevalent in this county, and the great depreciation of the value of money, which was effected by the circumstances that distinguished the termination of the last century, has apparently contributed to prevent their introduction to general use, and by that means sensibly retarded the improvement of the various parts of agriculture.

That the security which the tenants obtain by means of leases, is among the primary sources of agricultural improvement, is too obvious to be disputed; but such have been the peculiar circumstances of the times, that little similarity of opinion appears to subsist, either among the proprietors or the tenantry.

The farmers seem, in general, to desire leases of their farms, but many of them, impressed with the opinion that different crops are required under the varying circumstances of times and seasons, express a resolution rather to leave their farms, than submit to be held to any precise and invariable course of cropping.

Some of the leases or agreements, contain a desire, that white corn may not be sown successively on the same land, and in other cases it is prohibited under a penalty of 20*l.* per acre. But this rule, which is deemed to be founded on just argument in this county, as well as in most other parts of England, is frequently violated by farmers of great property and intelligence, in various parts of the sandy and gravelly districts, and there

there are few who would deem it prudent to enforce this rule with severity.

It is generally recommended to the tenants, to sow pease after wheat on the light soils, but if pease will not succeed on the same soil without an interval of nine or eleven years, it must be bad policy to insist on their regular return every five or six years. On very light warren sands that have not been marled, some instances have been seen of repeated crops of oats, under the direction of the landlord himself; and if little success attended this measure, it is probable that the prospect of a crop of pease would have been still more hopeless. At Warden, the tenants of Lord Ougley sometimes sow oats after wheat, and his Lordship observes, that a good tenant ought to be left in a great measure to his own discretion in such matters.

Several considerable farmers contend, that it is absurd to point out a regular mode of cropping, which the failure of clover, and other causes, may render impracticable, and they observe, that a tenant's hands are sometimes tied by the arbitrary rules of such as are destitute of the local experience which might enable them to decide on their propriety. The tenants are generally restricted from selling hay, straw, or manure, and though such restrictions are necessary for the landlord's security, it would be absurd to inquire into minute trespasses of this kind, as there are none who do not occasionally feel the necessity of purchasing hay, which could not be done if no person was permitted to sell.

In some covenants, the tenants are required to purchase two loads of manure for every ton of hay which is sold, or not consumed on the farm.

The agent of a considerable proprietor in this county observes,

observes, that his employer never refuses a lease to a good tenant; but that many farmers cannot be made to comply with the regulations of a lease, unless by prosecutions which would ruin them; they receive therefore verbal assurances that all permanent improvements shall be paid for. In some other cases a clause of this kind is inserted in the written agreements, but in a greater number of instances every thing of this kind is left to chance; and a considerable proprietor in this county informed the Writer of these pages, that he had seen many instances in which tenants had been injured by a neglect of their claims to remuneration for recent improvements.

The want of confidence which sometimes subsists between landlords and tenants, is most perceptible amongst the lower classes of cultivators, and may be adduced as the reason why their exertions are sometimes comparatively small. The advocates of a monopoly of farms, may easily discover the source of their mistrustful caution, and the injury sustained by agriculture on that account.

The custom of holding farms from year to year, though in some respects unfavourable to great exertions in improvement, is known to promote a friendly intercourse between landlord and tenant, and is in reality more conducive to permanency of occupation than long leases.

The farms of Bedfordshire generally descend from father to son through a long series of years, and perhaps as frequently change their owners as their occupiers. The large farmers, therefore, are secure in their possessions, and the benefit of their improvements, if not overburdened with increased rents, descends to their children.

SECT. VII.—COMPARISON OF TIMES.

As the very considerable, and, in some degree, gradual advance in the price of every article of agricultural labour and produce, must have been owing to some cause or causes, the greater part of which are not of an accidental or temporary nature, it is important to preserve every record that may tend, in any degree, to elucidate a comparison of the ancient and modern situation of the agriculturist.

The most early mention which I have met with of the prices of corn in Bedfordshire, I have extracted from the *Annales of Dunstable*, by Hearne.

1253. Before autumn, wheat sold for 5*s.* a quarter; but so great was the scarcity, that it afterwards rose to 8*s.* per quarter.

1254. Each acre of wheat or oats for 2*s.*

1255. A scarcity of corn, that, except for last year's, many must have starved.

1258. Such a scarcity of corn this summer, that wheat at Northampton was 20*s.* per quarter; at Bedford 17*s.*; here, one marc. A quarter of common malt 6*s.* 8*d.* Oxen used for ploughing at Dunstable.

1277. Wool, 6*d.* a fleece.

1283. Sheep had the itch, for which was used successfully, stale hog's-lard, quicksilver, and verdigrease.

1287. Such a plenty, that a quarter of wheat was sold generally for 20*d.* and a quarter of beans and oats 12*d.*

1294. A quarter of wheat, at the Peak, 21*s.*; here, 16*s.* 8*d.*; 1 quarter of salt 16*s.*

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The following communication was from the late Mr. How, of Aspley : it was extracted from an old family book of household expenses. The last column contains the prices of the year 1788.

	<i>Years.</i>	<i>Prices.</i>				1788.
Wheat, per bushel,	1669	£.0	4	5	£.	—
	1675	0	2	10		—
	1701	0	3	3		—
	1703	0	4	5	0	6 0
Pease, per bushel,	1669	0	2	2	0	3 3
Oats, per bushel,	1669	0	1	6		—
	1685	0	2	8		—
	1690	0	1	10	0	2 2
Rye, per bushel,	1672	0	1	11		—
	1695	0	3	0		—
	1696	0	3	0	0	3 6
Beans, per bushel,	1672	0	2	8	0	3 3
Barley, per quarter,	1695	0	11	0	1	4 0
Ditto, per bushel,	1685	0	2	0	0	3 0
Malt, per bushel,	1686	0	2	6		—
	1701	0	2	6	0	5 0
Straw, per load,	1696	0	10	0	1	0 0
						or more.
Wood, per load,	1669	0	10	8	1	8 0
Hay, per cwt.	1690	0	1	0		—
	1695	0	1	6	0	2 3
Butter, per pound,	1669	0	0	5		—
	1685	0	0	5½	0	0 9
						Salt,

	<i>Years.</i>	<i>Prith.</i>	<i>1786.</i>
Salt, per bushel,	1689 £.0 2 2	£. —	
	1696 0 4 0	0 8 0	
Lime, per bushel,	1688 0 0 6	0 0 8	
Hemp, per pound,	1689 0 0 6	0 0 8	
Flax, per pound,	1691 0 0 11	0 0 11	
Candles, per pound,	1689 0 0 4	—	
	1691 0 0 4	0 0 8	
Soap, per pound,	1689 0 0 5½	0 0 8½	
Raisins, per pound,	1689 0 0 3	0 0 4½	
Pigeons' or hens' dung, } per bushel,	1695 0 0 6	0 0 6	
Brandy, per gallon, ..	1689 0 3 6	0 9 6	
Pork, per pound,	1695 0 0 3	—	
	1703 0 0 2½	0 0 4½	
Men's shoes,	1674 0 2 10	0 6 3	
Women's shoes,	1690 0 2 0	0 4 2½	
Stockings,	1690 0 1 0	0 2 0	
Making a coat,	1701 0 3 0	0 3 6	
Labourers, per day,	1686 0 0 10	0 1 0	
Horse, hay per night, ..	1686 0 0 4	0 0 8	
Poor-rate (Aspley), in } the pound,	1689 0 0 3	—	

Amount

	Years.	Prices.	1788.
Amount of ditto per ann.	1669	16 9 4	—
	1679	11 12 6	—
	1696	18 7 0	—
Pauper's allowance per } week,	1690	0 0 6	—
	—	0 1 0	—
	—	0 1 4	—
Old widow ditto,	—	0 2 6	—

1800. Hay 5*s.* per cwt.; straw, per load, 4*l.* to 4*l.* 4*s.*; starch 1*s.* 4*d.* per pound; hops 3*s.* 8*d.* maid-servant, per annum, 9*l.*; labourers, per week, 8*s.* to 9*s.*; hay time, per week, 7*s.* and victuals and ale; or 13*s.* per week without victuals, but small beer allowed: thatchers 12*s.*; servers 9*s.*; bricklayers 18*s.*; ditto labourers 10*s.* 6*d.*; harvest 2*l.* 2*s.* per month, and board; harvest without board, 4*l.* 4*s.*; money raised by the poor's-rates in 1775, 135*l.* 9*s.* 11*d.*; ditto in 1802, to Easter 1803, 247*l.* 14*s.* 4½*d.*

In the Rev. Mr. Cooper's Historical Account of Wimington, is the following statement of the ancient rents of land :

Anno 1351. 248 acres of land, at 10*s.* 4*d.* per annum, the price of one acre being only ¼*d.*; 1½ acre of meadow 4*s.*—Anno 1361. 100 acres, at 2*d.* per acre.

The price of the arable land at Wimington in 1785, according to Mr. Cooper, was 5*s.* 6*d.* per annum; the enclosed, 20*s.* per acre; and the poor-rates 2*s.* 3*d.* in the pound.

The same gentleman's account of the prices of various articles at Puddington, is dated 1782 :

Farmer's

Farmer's head man 7*l.* to 10*l.*; geese 3*s.*; butter, all the year round, 7½*d.* per pound; cheese of this country, 3½*d.* per pound; but Warwickshire, better, at 4*d.*;—meat 3½*d.* to 4*d.* per pound in general; land 12*s.* per acre; cottage rents 30*s.* to 55*s.*; bush fag-gots 5*s.* or 6*s.* per hundred; hard wood 1*l.* 1*s.* per waggon-load; coal 16*d.* per bushel, carriage included. Labourers, a mess of milk in the morning.

In another book of household expenses, I find the following prices for the year 1745:

Soap 7½*d.* per pound; starch 5*d.* ditto; butter 5*d.*, 6*d.* and 7*d.*; ashes 8*d.* per bushel; rice 4*d.* per pound; a couple of rabbits 9*d.*; pigeons 4*d.* a piece; ducks 6*d.*; mutton 2½*d.* per pound; beef 2½*d.* per pound.

The total annual expenses for nine years of the family, which consisted of five, and sometimes a young child, appears to have varied but little during that period.

	£.	s.	d.		£.	s.	d.
1745 expense,	49	9	0	1750 expense,	59	1	0
1746 ———	45	0	0	1751 ———	46	0	0
1747 ———	45	11	9	1752 ———	46	1	9
1748 ———	41	16	0	1753 ———	48	18	10
1749 ———	45	9	0				

Prices at Carleton, from an old manuscript :

1714.			1720.		
100 of tiles,	£.0	1 0	5 sheep,	£.1	10 0
Load of straw,	0	5 0	2 cows,	4	10 0
Thatcher, per day, ..	0	1 3	1 cow,	3	0 0
Server,	0	0 10	A horse,	5	10 0
Elm board, per cent.	0	9 6	4 cart-horses,	15	0 0
20 pole of ringewood, 0	10	0	A sow and 10 pigs, }	2	15 0
Oak board, per foot, ..	0	0 1½	3 weeks old, }		
Digging clay,	0	0 3	9 pigs, 1 month old each,	0	5 0
			A tithe-man,	1	12 6
			A common harvest-man,	1	8 0
			A hoveller (builder),	}	1 10 0
			with gloves and ear-nest,		
			1721.		
			A common harvest-man,	1	11 0

The following memoranda of the prices of cattle, and various other articles, were extracted from an old book of farming accounts which belonged to a farmer of Liddlington :

Anno 1749, malt 3*s.* per bushel ; 1756, at 2*s.* 8*d.*

Hay, according to this and another account, per cwt. :

	<i>s.</i>	<i>d.</i>		<i>s.</i>	<i>d.</i>
1742	1	6	1756	1	8
1745 1 <i>s.</i> 6 <i>d.</i> and	1	8	1758	1	6
1749	2	4	1765	2	0
1753	3	0	1766	3	0

For keeping three pigs one week, 4*s.*

Sheep.

1733. 17 sheep (sort not mentioned), 8*s.* each.

1736. 40 sheep, at 8*s.* per head.

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1737.

1737. 10 sheep, at 13*s.* per head.
 20 sheep, at 8*s.* per head.
 1738. 60 sheep bought at fairs, at 9*s.* 6*d.*
 1777. Sheep mentioned at 10*s.* 6*d.* to 12*s.* 6*d.* ; couples,
 at 13*s.* 6*d.*
 1756. Fat lambs, at 11*s.* or 12*s.* each.
 1760. Many fat sheep sold to butchers at 10*s.* 6*d.*

Cows.

- 1733, and 1734. Average of 20 barren cows, 3*l.* 14*s.*
 6 cows and calves, 4*l.* Some cows at lower
 prices, but the kind not mentioned.
 1737. 3 cows and calves, at 3*l.* 5*s.* per head.
 Cows mentioned as high as 4*l.* 7*s.*
 1777. A cow, at 6*l.* 15*s.*
 1755. A fat cow (weight, 68 st. 6 lb. at 3*d.* per lb.),
 6*l.* 17*s.* 6*d.*

Calves.

1734. 11 calves, average 8*s.*
 1735. Average of 23 calves, 5*s.* 4*d.*
 1736. Average of 10 calves, 7*s.*
 1734 to 1738 inclusive. 108 calves averaged 6*s.*
 Prices varied from 2*s.* 6*d.* to 10*s.* each.
 1763. Many fat calves mentioned at 1*l.* 10*s.*

Horses.

1735. 1739. Average of 27 horses, 7*l.* 8*s.*
 In the same period, 5 colts, 6*l.*

Pork.

1756. Pigs of 11 or 12 st. at 3*d.* per lb. and 6*d.*
 abated on the whole.
 1760. Pork sold at 2½*d.* to butchers.

1765.

1765. Pigs at 4*d.* per pound, afterwards at 3½*d.*
 1771. Pork, 4½*d.* per pound.
 1776. Pork, 4½*d.*

Beef.

1755. Beef at 3*d.* per pound; 1756, at 3½*d.*
 1771. Beef at 3*d.* 3½*d.* and 4*d.* per pound. 1772, a
 cow at 3½*d.* per pound.
 1776. Beef at 4½*d.* 4*d.* and 3½*d.* per pound.

Mutton.

1756. Mutton at 3*d.* per pound; 1771, at 4½*d.*;
 1776, at 3½*d.*

Lamb.

1756. A leg of lamb, 6 pounds, at 3½*d.* per pound.
 1771. Lamb at 4½*d.*; 1776, at 5*d.*

Veal.

1756. Veal at 5½*d.* and 4½*d.* per pound.
 1776. Veal at 4*d.* per pound.

Wool, per Tod of 28lb.

	<i>s.</i>	<i>d.</i>		<i>s.</i>	<i>d.</i>
1743	15	0	1752	15	0
1744	16	0	1753	14	0
1745	16	0	1754	14	0
1746	16	0	1756	15	6
1747	14	6	1757	17	0
1748	14	0	1758	18	0
1749	15	0	1759	18	0
1750	18	0	1761	14	0

1771. Wool at 2*ls.* per tod; lambs' wool 6*d.* per
 pound.

It is also remarked, that in 1748, eight fleeces made 26 lb. or $3\frac{1}{4}$ lb. each fleece.

The greater part of the above statement of the prices of wool, is taken from some tithe accounts of the Rector of Milton Bryan, from 1742 to 1761 inclusive. The prices of labour, &c. coincide nearly with those at Liddington during that period, and appear to have experienced no alteration for at least 19 years.

Labourers, 10*d.* per day; roundsmen, 8*d.* per day; and these appear to have been numerous about the year 1753. In hay-time, the men receive 1*s.* per week, and some food and ale occasionally, though the quantity is no where mentioned.

The pay for female hay-makers was 6*d.* per day, and in harvest they are afterwards mentioned at 8*d.* per day.

Harvest-men's wages, 1*l.* 11*s.* with food and ale, and 1*s.* per day after the month.

Many parcels of various kinds of straw are mentioned at 5*s.* and a load of wheat straw at 10*s.* Horse-hire, 6*d.* and 8*d.* Cows at straw, 6*d.* per week; which was raised about 1752 to 8*d.* and 1*s.*

The price of ploughing an acre of land was 5*s.*

The following summary of the comparative expenses on arable land, in the years 1790 and 1803, is extracted from the Returns made to the Circular Letters of the Board of Agriculture.

No.		Day Labour.							
		Winter.				Summer.			
		1790.		1803.		1790.		1803.	
		s.	d.	s.	d.	s.	d.	s.	d.
1.	Elstow,	7	0	9	0	9	0	12	0
2.	Knotting,	6	0	9	0	8	0	11	0
3.	Woburn,	8	0	9	0	10	0	12	0
4.	Pertenhall,	7	0	10	0	10	0	12	0
5.	Luton,	6	6	10	0	8	0	12	0
6.	Henlow,	7	0	9	0	8	0	11	0

No.	Harvest.						Head Carter.						Under Carter.					
	1790.			1803.			1790.			1803.			1790.			1803.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1.	2	0	0	2	12	6	10	10	0	14	14	0	5	10	0	8	0	0
2.	2	2	0	3	5	0	10	0	0	15	0	0	7	10	0	10	0	0
3.	4	4	0	4	16	0	0	12	0	0	15	0	0	10	0	0	12	0
4.	2	2	0	2	12	6	—	—	—	—	—	—	—	—	—	—	—	—
5.	1	16	0	2	5	0	8	8	0	12	12	0	2	10	0	3	13	6
6.	1	19	0	3	0	0	8	8	0	11	11	0	4	0	0	6	0	0

No.	Thrashing Wheat per Quarter.				Thrashing Barley per Quarter.				Reaping Wheat per Acre.				Mowing Barley per Acre.			
	1790.		1803.		1790.		1803.		1790.		1803.		1790.		1803.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1.	2	0	2	8	1	4	2	6	—	9	0	—	3	0	—	—
2.	1	6	4	0	1	2	2	2	5	6	11	0	1	6	2	9
3.	2	8	4	0	1	6	2	3	7	6	10	0	2	6	3	6
4.	2	0	3	3	1	0	1	8	5	0	6	0	1	3	2	0
5.	2	8	1	4	1	6	2	0	10	0	16	0	1	8	2	3
6.	2	0	4	6	1	3	2	3	5	0	12	0	2	0	3	0

Blacksmith's Work.

No.	Wheel-tire.				Plough-work.		Chains.		Shoeing.			
	1790.		1803.		1790.	1803.	1790.	1803.	1790.		1803.	
	s.	d.	s.	d.	d.	d.	d.	d.	s.	d.	s.	d.
1.	4	9	5	6	6	7	7	6	0	6	0	7
2.	0	3 $\frac{1}{4}$	0	3 $\frac{1}{4}$	6	7	6 $\frac{1}{2}$	6	0	5	0	7
3.	0	2 $\frac{1}{2}$	0	3	—	—	6 $\frac{1}{2}$	7 $\frac{1}{2}$	14	0	16	0
4.	—	—	—	—	—	—	—	—	0	5	0	6
5.	2	6	3	6	4 $\frac{1}{2}$	6	—	—	0	5	0	8
6.	4	8	5	0	5	7	3	4	0	6	0	7

Artisans.

No.	Carpenter per Day.				Mason per Day.				Platner per Day.				Collar-maker.			
	1790.		1803.		1790.		1803.		1790.		1803.		1790.		1803.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1.	1	62	0	1	62	0	—	3	0	—	—	—	—	—	1	5
2.	1	82	8	1	102	8	1	82	92	5	0	3	2	0	—	—
3.	2	63	0	—	—	—	2	03	0	—	—	—	—	—	1	1
4.	1	62	0	1	62	0	2	64	6	—	—	—	—	—	—	—
5.	1	82	6	1	82	6	1	62	6	—	—	—	—	—	—	—
6.	1	82	4	1	82	6	1	42	5	—	—	—	—	—	—	—

No.	Rent.								Poor-rates.				Tithes.			
	1790.				1803.				1790.		1803.		1790.		1803.	
	£.	s.	d.	£.	s.	d.	d.	s.	d.	s.	d.	s.	d.	s.	d.	d.
1.	50	0	0	96	0	0	3	6	3	6	—	—	—	—	—	—
2.	—	—	—	—	—	—	4	0	7	0	3	0	6	0	—	—
3.	—	—	—	—	—	—	2	0	3	0	—	—	—	—	—	—
4.	0	7	0	0	18	0	3	4	5	6	—	—	—	—	—	—
5.	—	—	—	—	—	—	2	6	3	9	3	6	5	9	—	—
6.	0	6	8	0	10	0	—	—	2s. 6d. to 4s. 6d.	2	6	4	6	—	—	—

GENERAL

GENERAL EXPENSES OF CULTIVATION.

Elstow, 1803.

Turnips, per acre,	£.5	12	0
Barley after turnips,	3	8	6
Wheat on lay,	3	18	2
Wheat on tilth,	6	4	8

Including rent, and parochial taxes.

Knotting.

	1790.	1804.
Turnips,	£.3 15 0	£.4 14 0
Barley,	3 15 0	4 16 0
Wheat,	4 5 0	5 5 0

Exclusive of rent and taxes.

Woburn.

	1790.	1803.
Turnips,	£.3 10 0	4 10 0
Tilth barley,	3 2 6	4 2 6
Wheat,	3 2 6	4 2 6

Including the value of farm-yard dung.

Luton.

	1790.	1803.
Turnips,	£.3 0 0	4 10 0
Barley,	2 0 0	3 5 0
Wheat,	4 15 0	6 0 0

It is almost impossible to make any general inference from these various estimates of expenses.

The circumstances under which they were collected, required their being written with a degree of haste totally inconsistent with accuracy, and the rather, as some of the subjects are of the most intricate nature, and require much patient investigation.

The different earnings of winter and summer, though described as day labour, must be intended to include earnings by the piece, when the days have attained a considerable length: as also the superior pay of *hay-time*, for the custom of altering the pay of the mere day-labourer in summer and winter, is very little known in this county. In the expense of harvest, No. 3, indicates a kind of board wages. The five other communications relate to the pay for the month, "with all manner of victuals and drink." From the table it would appear, that prices were lower at Luton than in any other part of the county, which would certainly be an erroneous conclusion.

The wages mentioned under the titles of Head-carter, &c. might lead to very vague conclusions, and no average can be formed from such insufficient data. The high wages of fourteen or fifteen guineas is sometimes given by the large farmers, but in the farms of moderate size, from eight to ten guineas is much more common.

The table which relates to thrashing, reaping, &c. seems less incapable of affording a fair average than the preceding.

Averages.

	1790.		1803.	
	s.	d.	s.	d.
Thrashing wheat, per load,	1	4	2	4
Thrashing barley, per quarter,	1	3½	2	1½
Reaping wheat, per acre,	6	7½	10	8
Mowing barley, per acre,	1	9½	2	9
			Wheat	

Wheat is generally thrashed by the load, and barley is very seldom mown by the acre.

In addition to the prices of reaping wheat per acre, the men are in some places allowed a quart, and in others two quarts of ale, per day.

The prices mentioned in communications 4 and 5, have the appearances of extremes, and are certainly not the average of a term of years.

In the table of blacksmith's work, some irregularities appear which are not easily accounted for. The shoeing of horses is, however, to be expected, like many other articles, to cost more in the market-towns, where there is much traffic, than in the villages.

The average rise in the expense of artisans is as follows :

<i>Artisans, per Day.</i>	1790.	1803.
	<i>£.</i> <i>d.</i>	<i>£.</i> <i>d.</i>
Carpenter,	1 9	2 5
Mason,	1 7½	2 2½
Thatcher,	1 9½	2 11½
Collar-maker,	—	½

By the above table it would appear, that the mason, or rather bricklayer, received less pay than the carpenter, which is however not true. A quart of ale per day, is also commonly given to carpenters, &c. in addition to their pay in money.

The poor's rates appear by the table to have remained stationary at Elstow, though they have actually risen 92 per cent., the rental of the parish having been advanced in that proportion.

The advance of rent in the county in general, cannot be learned from the table before-mentioned, nor perhaps from any other source.

In many places the alteration of rent has happened only

only at the time of enclosing, and is consequently combined with the tithes, &c.

In estimating the general expenses of cultivation, a different method was taken by each of the writers. The first includes the rent and parochial taxes: the next excludes both of these important articles: the third includes the value of farm-yard dung; and in the fourth it does not appear what is included or excluded.

<i>Expense of Arable.</i>	1790.	1803.
Elstow,	£. —	£.4 15 10
Knotting,	3 18 4	4 18 4
Woburn,	3 5 0	4 5 0
Luton,	3 5 0	4 11 8

The following return of the expenses of arable land, belongs to the chalky district, but two of the articles present such obvious proofs of the incorrectness which results from haste, that no general deduction can be drawn from them.

The charges on 100 acres arable:

	1790.	1803.
Rent,	£.80 0 0	£.100 0 0
Tithes,	17 10 0	28 15 0
Rates and taxes,	12 3 9	23 11 6
Wear and tear, viz. black-smith, wheeler, collar-maker, &c.	10 0 0	14 10 0
Labour (beer and board included),	88 10 0	130 0 0
Seed,	57 1 0	57 1 0
Manure purchased,	60 0 0	82 0 0
Team (keep of four horses),	140 4 0	140 4 0
Interest of capital,	25 0 0	30 0 0
	£.490 8 9	£.605 1 6

The

The tithe-books of Milton Bryan (before-mentioned) furnish the earliest accounts of the prices of corn in this county, that admit of comparison with those of the present times.

To these, I have added the average prices of corn at Bedford for 30 years, from a manuscript of the Rev. T. O. Marsh.

These prices I have contrasted with those of Windsor, as reduced to statute measure and average quality, in Stockdale's edition of Smith's Corn Tracts. After 1770, they are contrasted with the general average of England and Wales, from the Corn Register, which, from 1771 to 1781, very nearly coincides with the prices at Windsor market.

The average price of corn at Bedford, appears to differ from the general average of England and Wales no more than 1*d.* per bushel, which is too trifling a variation to deserve notice, even were it not probable that the price of Bedford is below the general average of the county.

The average prices of wheat and malt from 1595 to 1765, are also inserted, as they furnish one mean to elucidate a question of high importance to the British farmer, viz. What has been the situation and prospects of his ancestors, so far as they were affected by the value of the prime articles of the products of the earth for 210 years, and what are the prospects of the agriculturist at the commencement of the nineteenth century?

Comparative Tables of the Prices of Corn.

Windsor Prices, reduced to Statute Measure and Ave- rage Quality.										Tithes Accounts, Milton Bryan, Bedfordshire.										
Years.	Wheat per Quarter.			Wheat per Load.			Wheat per Load.			Barley per Quarter.			Tithches, or Tares, per Load.			Beans per Load.			Oats per Qr.	
	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.
1740	2	0	0	1	5	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1741	1	16	10	1	3	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1742	1	6	10	0	16	9	0	14	6	0	19	6	0	16	0	11	6	—	—	—
1743	0	19	7	0	12	3	0	12	6	0	12	6	0	9	6	8	0	—	—	—
1744	0	19	7	0	12	3	0	12	3	0	12	0	0	8	4	8	6	—	—	—
1745	1	1	8	0	13	6	0	16	6	0	12	6	0	10	0	8	0	—	—	—
1746	1	10	9	0	19	2	0	17	6	0	12	0	0	8	6	9	3	—	—	—
1747	1	7	7	0	17	3	0	17	6	0	15	0	0	10	0	9	6	10	0	0
1748	1	9	2	0	18	3	0	18	6	0	17	6	0	10	6	12	0	—	—	—
1749	1	9	2	0	18	3	0	17	6	0	15	0	0	10	0	10	0	12	0	0
1750	1	5	8	0	16	0	0	18	0	0	14	0	0	12	6	10	6	9	0	0
1751	1	10	5	0	19	0	1	0	6	0	17	6	0	15	0	12	0	—	—	—
1752	1	13	0	1	0	7	1	2	6	0	16	6	0	15	0	12	0	10	0	0
1753	1	15	3	1	2	0	0	17	6	0	18	0	0	18	0	12	6	13	0	0
1754	1	7	4	0	17	2	0	14	0	0	12	0	—	—	10	0	—	—	—	—
1755	1	6	8	0	16	8	1	3	0	0	13	0	0	9	6	12	0	—	—	—
1756	1	15	9	1	2	4	2	0	0	1	8	6	0	17	0	18	0	14	0	0
1757	2	7	4	1	9	7	1	4	0	1	5	0	1	2	6	18	6	—	—	—
1758	1	19	6	1	4	8	0	19	0	0	17	6	0	19	6	12	6	10	6	6
1759	1	11	5	0	19	7	0	18	0	—	—	—	—	—	11	0	10	6	6	6
1760	1	8	10	0	18	0	0	14	6	0	13	6	0	14	0	12	6	—	—	—
1761	1	3	10	0	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1762	1	10	10	0	19	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1763	1	12	2	1	0	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1764	1	16	11	1	3	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1765	2	2	8	1	6	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1766	1	18	3	1	3	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1767	2	11	0	1	11	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1768	2	7	10	1	9	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1769	1	16	11	1	2	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Compara-

Comparative Prices, from the Corn Register.

Average of England and Wales.										Bedford.									
Years.	Wheat per Quarter.			Wheat, per Load of 5 Bushels.			Wheat per Quarter.			Barley per Quarter.			Oats per Quarter.			Beans per Quarter.			
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	
1770	1	18	8	1	4	2	1	19	0	1	2	0	0	16	11	1	4	4	
1771	2	7	2	1	9	6	2	7	10	1	5	10	0	18	6	1	5	8	
1772	2	10	8	1	11	8	2	12	8	1	6	6	0	17	3	1	13	0	
1773	2	11	0	1	11	10	3	0	4	1	14	6	0	17	10	1	10	4	
1774	2	12	8	1	12	11	2	14	10	1	9	0	0	18	4	1	16	10	
1775	2	8	4	1	10	2	2	8	4	1	11	0	0	15	9	1	4	10	
1776	1	18	2	1	3	10	1	16	4	1	2	5	0	15	3	1	4	8	
1777	2	5	6	1	8	5	2	5	4	1	0	6	0	17	0	1	5	4	
1778	2	2	0	1	6	3	2	1	10	1	1	9	0	14	6	1	4	10	
1779	1	13	8	1	1	0	1	12	10	0	19	7	0	14	0	1	1	10	
1780	1	15	8	1	2	3	1	18	8	0	18	2	0	13	9	1	2	6	
1781	2	4	8	1	7	1	2	7	8	0	18	2	0	14	9	1	4	6	
1782	2	7	10	1	9	1	2	8	4	1	3	3	0	14	6	1	6	4	
1783	2	12	8	1	12	1	2	14	0	1	10	6	0	17	0	1	8	10	
1784	2	8	4	1	10	2	2	8	0	1	7	9	0	18	3	1	8	3	
1785	2	1	6	1	6	0	2	1	0	1	4	9	0	19	0	1	8	10	
1786	1	18	6	1	4	1	1	15	4	1	2	9	0	17	0	1	8	4	
1787	2	0	6	1	5	4	2	0	4	1	4	6	0	17	0	1	8	4	
1788	2	4	4	1	7	8	2	3	4	1	0	6	0	14	9	1	2	12	
1789	2	11	0	1	11	10	2	11	2	1	4	3	0	15	0	1	4	14	
1790	2	12	5	1	12	9	2	5	0	1	10	0	1	0	0	1	14	4	
1791	2	6	5	1	9	0	2	4	0	1	7	6	0	19	0	1	9	5	
1792	1	19	3	1	4	6	2	5	0	1	10	0	1	0	0	1	14	4	
1793	2	8	8	1	10	5	2	5	6	1	10	7	1	1	11	1	14	0	
1794	2	11	0	1	11	10	2	9	2	1	12	9	1	2	9	2	5	1	
1795	3	14	1	2	6	5	3	16	10	1	17	0	1	9	11	2	0	1	
1796	3	16	8	2	7	1	3	12	1	1	13	4	1	0	10	1	16	4	
1797	2	12	10	1	13	3	2	5	5	1	4	3	0	15	3	1	4	3	
1798	2	9	9	1	11	1	2	2	3	1	5	6	0	19	4	1	5	14	
1799	3	7	4	2	2	1	3	0	2	1	14	5	1	9	2	2	7	5	
1800	5	13	1	3	10	8	5	12	10	2	19	2	1	18	5	3	3	2	
1801	5	18	0	3	13	9	—	—	—	—	—	—	—	—	—	—	—	—	
1802	3	7	0	2	1	10	—	—	—	—	—	—	—	—	—	—	—	—	
1803	2	16	0	1	15	0	—	—	—	—	—	—	—	—	—	—	—	—	
1804	3	2	0	1	18	9	—	—	—	—	—	—	—	—	—	—	—	—	
1805	4	7	8	2	14	9	—	—	—	—	—	—	—	—	—	—	—	—	
1806	3	18	0	2	8	9	—	—	—	—	—	—	—	—	—	—	—	—	

A Table

Average Prices of the last Five Years, England and Wales.

Years inclusive.		Per Quarter.			Per Sack.			Per Load.			Per Bushel.		
		£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1802	1806	3	10	1	1	15	0	2	3	9	8	9	$\frac{1}{2}$
1802	1806	1	14	3	0	17	1	1	1	5	4	3	$\frac{1}{2}$
1802	1806	1	4	0	0	12	0	0	15	0	3	0	0
1802	1806	2	0	3	1	0	1	1	5	2	5	0	$\frac{1}{2}$

Having in the preceding tables exhibited the prices of corn for 67 years, it is still necessary to inquire, what are the average or permanent prices at the commencement of the nineteenth century?

The years of extreme scarcity ought not to be included in a general average, as these are rather disadvantageous than otherwise to the farmers in general. With this view, I have excluded the years 1800 and 1801, and taken the average of only the last five years, which appears to me the most proper basis of comparison, or calculation, that the tables afford; for though it includes a period in which the seasons have been rather ungenial, it includes one year (1803), in which the abundance of corn produced a depression of prices almost to the average of ten years succeeding 1769.

Whether the average prices of the last five years are likely to continue, is a question not easy to determine. The tables show, that on the average of 40 years, from 1646 to 1685, an acre of wheat, which should produce 20 bushels, would have been worth more to the farmer than 40 bushels in the years 1743 and 1744. The farmer, who, in the first 44 years of the last century, placed his chief dependence for support on the value

value of his wheat, and other corn; and the labourer, whose daily 10*d.* was expended mostly in bread or flour, found a great *advance* in the value of money toward the latter end of that period.

The labourers who had some partial remembrance of that era, have been many times heard to speak with great complacency of those good old times, “ere the *style* was altered, and the *pudding* lost its place.”

The encouragement that had been given to exportation, had caused agriculture to flourish; the farmers, awaked as it were from a lethargy, cultivated the ground which was formerly neglected; corn became gradually abundant, and, at the end of the time before-mentioned, so cheap, that the cultivation of it was no longer profitable to the cultivator.

“There is a tide in the affairs of men;”

and here, it appears, the tide began to turn; for in a few years England ceased to be an exporting country. The balance had gone over in favour of pasture; and if the opinion of many farmers in this county is just, it has remained on the same side to the present hour.

The comparatively small expense attending pasture, and the great advance in the price of butter, cheese, and butchers’ meat, which the luxurious appetite of modern times has consented to give, are arguments which are frequently heard, and which produce a slow, but certain and constant, effect.

Among the proprietors, the greater natural securities which pasture possesses against the encroachments of needy covetous tenants, and the high acreable rent of sward, in comparison with arable land, are arguments of weight and importance.

A coalition of landlord and tenant will have much effect

effect on the state of agriculture; and such, as far as regards the matter of fact, appears to be the case in the present instance.

It is generally observed, that the ground which will make good sward, *ought* to be laid down for permanent pasture; and the assigned reason is not far-fetched—it is the argument of all ages and nations, viz. such is the most *profitable* application of the soil by the occupier and proprietor.

But when it is observed that this rich, mellow, deep-stapled soil, which “ought to be pasture,” is precisely the soil which will bear wheat perhaps every three years, without exhaustion, and to the amount of from 30 to 50 bushels per acre; the soil from whence the principal support of millions is dealt out by Nature with almost boundless profusion—perhaps some reasons might be found to prove, that much of these better kinds of soil ought not to be pasture till that period, at least, when corn is too abundant.

If pasture land prove the most profitable, it will naturally receive the most attention; and the quantity of arable will be lessened, till a scanty supply of corn causes the price to rise sufficiently to restore the equilibrium of profit.

The immense and increasing importation of corn—a distinguishing characteristic of the last 30 or 40 years—is another inducement to the farmer to diminish still farther the empire of the plough, till corn receives an artificial advance, above the average of other countries, from a continual dread and apprehension of scarcity or famine. It appears, however, that those who have sat at the helm of public affairs in this country, have possessed far different ideas on this subject; they appear to have regarded the arable farmer as working in

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mines

mines of silver and gold, while the grazier was tending his flocks and herds in unprofitable deserts, just capable of preserving existence.

Of this opinion, the former taxes on carts and wagons, the present enormous one on malt, but more particularly the tax on *horses used in husbandry*, furnish abundant confirmation. If tillage did not decrease, and famine occasionally threaten the land that thus discourages the production of the staff of life, it might be doubted whether causes and effects have any connexion. The tax on horses may be considered, with strict propriety, as a fine and penalty on the use of the plough, and a premium on the production of the luxuries of the table.

Much has been said on the depreciation in the value of money. It is not necessary, for the present purpose, to examine the tables which were formed by Sir G. Shuckburgh, to shew the progress of this depreciation; but the nature of the subject seems sufficiently explained by the couplet of Hudibras :

"The real worth of any thing
Is just as much as it will bring."

On this rule, the following table for three remarkable periods is formed. The price of wheat is taken as a standard; and though it does not appear whether the other necessities of life have borne a relative proportional price, wheat is undoubtedly a principal source from which the arable farmer pays his rent, and the labourer feeds himself and family.

Relative

Relative Value of Wheat, per Quarter, and Day-labour.	1646 to 1685.	1790 to 1750.	1802 to 1806.
Wheat, per Quarter,	2 <i>l.</i> 11 <i>d.</i>	1 <i>l.</i> 8 <i>s.</i> 2 <i>d.</i>	3 <i>l.</i> 10 <i>s.</i> 1 <i>d.</i>
Variation per cent. from } the middle period, }	145	100	248
Bushels per acre, of equal } total value,	20	29	11½
Pay of day-labour, to pur- } chase equal quantities of } bread,	14½ <i>d.</i>	10 <i>d.</i>	24 <i>d.</i>
Actual price of common } day-labour,	7½ <i>d.</i>	10 <i>d.</i>	18 <i>d.</i>

Various collateral circumstances may have affected the situation of the farmers and their labourers, in the times mentioned in the table, and their relative condition may not have been precisely such as the table would indicate. The increase in the value of money, while the pay of labourers was also increased, could not fail to place them in circumstances of comparative ease and plenty. But unless the farmer could grow 29 bushels of corn where his ancestors grew only 20, which is not probable, his situation was become, at the middle period, far from enviable.

The modern alterations of price, as collected from the preceding accounts, will be found in the following table.

A Table of the Comparative Prices of Corn and Cattle.

Years.	Horses, Average of 27.	Colts, Average of 5.	Barren Cows, Average of 20.	Cows with Calves, Average of 9.	Calves, Average of 108.	Sheep, Average of 147.	Wool, per Tod of 28 lb.	Wheat per Quarter.
1730 to 1740, and wheat to 1750,	£. s. d. 7 8 0	£. 6	£. s. d. 3 14 0	£. s. d. 3 15 0	s. d. s. 6 0 9	s. d. s. 0 15 2	d. 1	s. d. 8 2
		Pork per lb.	Beef per lb.	Veal per lb.	Lamb per lb.	Mutton per lb.	Wool.	Wheat.
1750 to 1760, ..	..	3½d.	3½d.	5d.	3½d.	3d.	16 2	1 13 2
1802 to 1807; ..	..	8d.	7½d.	9d.	8½d.	7½d.	..	3 10 1

The materials on which the table is founded are so scanty, that no unequivocal result can be deduced from them. The value of cattle appears, in most instances, to be not more than one-fourth of that of the present time. The price of mutton and beef, which is stated at 2½d. per pound in 1745, is exactly one-third of the present price; but if the price of wheat on the average of ten years, from 1740 to 1749 inclusive, be tripled, it amounts to 4l. 4s. 3d. per quarter, or 14s. 2d. above the present price of wheat, at a time, too, when tillage has been partially burdened.

The average prices of meat, wool, and corn, seem, as far as the table is a good authority, to have kept pace with each other to the present era, with no perceptible deviation. But if the tillage farmers feel—only

only imagine they feel—the weight of partial taxation, the growth of corn will be diminished; they will apply this principle of starvation—an engine which no power can wrest out of their hands—till the advance of prices remunerates their increased expenses, and teaches governments, that to tax the plough is to oppress the poor. Every one who is aware, that it costs the farmer 1s. or more, on the average, for every five bushels which he removes no farther than four or five miles, need not be told the consequence of procuring food for the poor at a distance of 1000 miles. The progress of the importation and exportation of wheat may serve as a kind of *barometer*, to indicate the state of the poor who consume it. The poor, and their mistaken advocates, who declaim against exportation—which is their best and only security—would do well to reflect, that neither the farmers, nor any other class of people, will long persevere in producing a commodity, for which there is not a regular and adequate demand.

The average price of wheat from 1595 to 1685, was 17. 18s. ; but from the average of 20 years, from 1730 to 1749, it appears a depreciation of price had taken place to the amount of nearly 10s. per quarter. Money obtained from any permanent source, had consequently become more valuable in an inverse ratio.

The depreciation of money, which was the consequence of the importation of the precious metals, had therefore ceased, and the depreciation of the present times must be deduced from a source entirely distinct, which, it is thought, will be readily found in the modern system of commercial credit, paper money, and national mortgage.

SECT. VIII.—EXPENSE AND PROFIT OF ARABLE LAND.

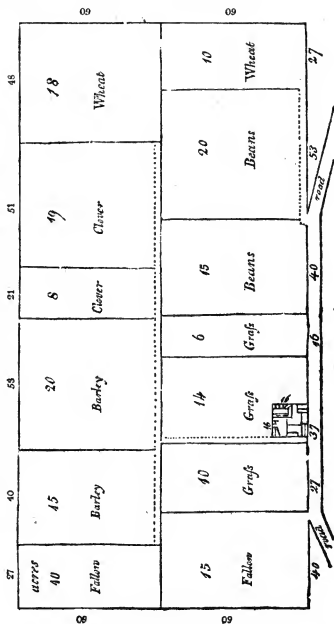
To ascertain the expenses and profits of agriculture, in all its various shapes and circumstances, is a subject of more than ordinary difficulty, and though it does not appear that it has been, in any case, minutely investigated, so many erroneous or partial estimates have been laid before the public, as to induce some to believe, that no tolerable approximation to the truth can ever be obtained. The fundamental error of many calculations, appears to consist in the rejection of averages, and making use of local and temporary prices to serve as the basis of general deductions, in consequence of which, several of the cattle crops, the intrinsic merit of which is still considered by some as not well established, have been represented as capable of affording more profit in the fallow season, than is commonly obtained by the whole subsequent course of cropping under the management of a good farmer.

That there is some latent source of delusion in such calculations is not to be doubted, and nothing short of a very minute inquiry into every step of the business, is likely to furnish a proper basis of calculations applicable to all times and circumstances. It is impossible to ascertain the average size and shape of the farms; but thus far is well known, that the dwelling house and offices are seldom found in the centre of a farm, whether it be large or small, and that there are great irregularities in the size of the fields, and the number of acres allotted to each season, as it is here termed, or to each kind of crop in the regular course of husbandry. The average size of arable farms in this county, has
been

been estimated at 150 acres, and with the exception of gentlemen's parks, open fields, and cottage allotments, it is probable that the average size of enclosed pastures is ten acres, and of enclosed arable fields is 15 acres each.

The subsequent calculations are intended to apply more particularly to a farm of the above description, which may be considered as possessing at least an average share of the conveniences of occupation which are commonly met with in this county.

A Plan of a Farm, of 150 Acres Arable, and 30 Acres Pasture.



The division fences of the farm here represented, are 900 poles in length: in addition to this, one-sixth of the boundary fence being contiguous to a public road, belongs to the farm, and half the remainder is of course as likely to belong to this farm, as to the adjoining ones. The entire length of the fencing is, therefore, 1320 poles, and as about four yards in width is taken from the plough by every live fence, the quantity to be deducted from the arable, &c. in this instance, is exactly six acres, or one-thirtieth of the whole farm. The roads which are necessary for opening a communication with the different parts of the farm, will be about a pole in width, and 278 poles in length, occupying about one acre in a hundred.

In order to avoid fractions as much as possible, it will be necessary to suppose the boundaries of the farm extended on all sides about ten yards beyond the lines marked in the map, which will include nearly the seven acres and four-fifths, which are supposed to be consumed in hedges and roads.

Much of the expenditure of a farm is connected either directly or indirectly with the

Domestic Expenses.

Farmer's bread.—In estimating the expense of this and all other articles of consumption, the average value, as near as can be ascertained, will be invariably used.

A load of wheat consisting of five Winchester bushels, is presumed to weigh	}	£.2 3 9
300 lbs.		
Ditto per bushel 60 lbs. value,		0 8 9 ⁴
Value per lb.		0 0 1 ¹ ₂
		From

From a load of wheat is taken three bushels, or 39lb. of bran, and the mill waste is 5lb. more. The bran pays for grinding and something more, viz. grinding per load 25*d.*; bran per bushel 9*d.*

The clear weight of a load of wheat when ground, 4 bush. 2 pecks 4lb. Value of flour per lb. 2½*d.* Value of flour per bushel, of 56lbs. 9*s.* 7*d.*

It appears by experiment, that 67lbs. of flour, one pint of yeast or barm, and 1lb. of salt, will make 90lbs. of bread.

67lbs. of flour,	£.0	11	5
1lb. of salt,	0	0	5
Barm,	0	0	3
Firing,	0	1	0
Labour,	0	2	0
Value of 90lbs. of brown bread,	0	15	1
Ditto per lb.	0	0	2
A half peck loaf, 8lb. 11oz,	0	1	6

Home-brewed Ale.—The farmers frequently send their barley to the maltsters to be malted for their own use, in which case the expenses of brewing, &c. will be nearly as follows :

Barley per quarter,	£.1	14	3
—— per bushel,	0	4	3½
Malting per quarter (by which it increases } half a bushel),	2	2	0
Expense per quarter to the farmer, nearly	3	12	0
—— per bushel,	0	9	0
Hops per lb.	0	1	6
A hogshead of 54 gallons is brewed with } five bushels of malt and 5lb. of hops, }	2	12	6

Coals,

Coals,	£.0	3	0
Brewing, &c.	0	3	0
Wear and tear of utensils, &c.	0	5	0
Total,	£.3	3	6
54 gallons of ale, at 1s.	2	14	0
54 gallons of small beer, at 3d.	0	13	6
Grains,	0	2	6
	£.3	10	0

Some farmers allow six bushels or more to a hogs-head; and the small beer that is not for present use, will require some fresh malt in addition to the above quantity. The public brewers have been accused, though perhaps in some instances unjustly, of making use of other ingredients than malt and hops.

The mode of brewing is known to make an essential difference in the liquor produced, but the labourers in general prefer home-brewed ale to that of the public brewers; and as it is known to be less liable to turn stale in summer, and possesses less of the intoxicating qualities, it may be presumed to be most conducive to health.

Meat and Vegetables.—Most of the farmers that are not very poor, are in the practice of purchasing some joint of butcher's meat, for the Sabbath day at least; but as pork is known to afford the cheapest subsistence, it is seldom omitted at a farmer's table: and such adults of the male sex as have much exercise, are thought to consume on the average 2lbs. per week. The ordinary price of fresh pork is about 8d. per lb. which, when salted, is sold at 11d. at the shops, but

as the farmer, by killing his own pigs, saves what would otherwise be gained by the retailers, it may be stated at about 10*d.* per lb. on an average.

The potatoe, being probably the cheapest, is also the principal vegetable used for sauce, and of these, apparently about 4lb. are consumed in a week, or one-fifteenth of a bushel of 60lbs.

The ordinary kinds of potatoes are about 1*s.* 6*d.* per bushel, and if to these be added the salt, pepper, vinegar, &c. which is used with the various kinds of sauce, it is probable the expense of garden vegetables, &c. may be estimated at about 2*d.* per week for each adult individual.

A summary of the various expenses of diet, &c. may be seen in the following table :

Expense of common Diet.	Per Day.	Per Week.	Per Annum.
	<i>d.</i>	<i>s.</i> <i>d.</i>	<i>£.</i> <i>s.</i> <i>d.</i>
Salted pork, 2lb. per week, at 10 <i>d.</i> per lb.	3	1 8	4 6 8
Garden vegetables, salt, &c.	0½	0 2	0 8 8
Brown bread, or common pudding, at 2 <i>d.</i> per lb. or 1lb. 4oz. per day, or half a peck per week,	2½	1 6	3 18 0
Skimmed milk, 3 <i>d.</i> per gallon, one-third per day,	1	0 7	1 10 5
Cheese, 1lb. per week, at 9 <i>d.</i> per lb.	1½	0 9	1 19 0
Small beer, 1½ pint, at 3 <i>d.</i> per gallon,	0½	0 4	0 17 0
Total,	8½	5 0	12 19 9
Additional Articles.			
Ale, 1 pint per day,	1½	0 10½	2 5 7½
Butter, half a pound per week, at 13½ <i>d.</i> ..	1	0 6½	1 9 3
Sugar, half a pound per week, at 9 <i>d.</i>	0½	0 4	0 19 6
Tea, an ounce per week, at 6 <i>d.</i> per oz.	0½	0 6	1 6 0
	3½	2 3½	6 0 4½

Firing.

Firing.—The expense of this article is not easy to ascertain, but it seems proper to charge a considerable portion of it to the master's share, as it will not decrease in proportion to the smallness of the family, and some of it will be exclusively appropriated to the use of himself and his friends and visitors. According to the returns made in consequence of the Population Act, it appears that the average number of persons in each family is $4\frac{6}{10}$, which may be considered as representing a father and mother, and a son, and a daughter, with a fraction representing the increase of population; and if to these be added a servant maid, and a horse-keeper, and a boy of all work, the farmer's family may be deemed to consist of seven persons, as a basis of calculation in the division of domestic expenses.

Expense of Firing.	Total.			Master's Share.			Servants, &c. Shares.
	£.	s.	d.	£.	s.	d.	s. d.
Per week, for 30 $\frac{1}{2}$ for warmth, 2s.	3	0	0	1	0	0	6 8
weeks in winter, $\frac{1}{2}$ for cooking, 2s.	3	0	0	1	0	0	6 8
Per week, for 22 weeks in summer, 2s.	2	4	0	0	14	8	4 10 $\frac{1}{2}$
Total per annum,	8	4	0	2	14	8	18 2 $\frac{1}{2}$

Cookery.—This may be estimated at 1s. per day, or 7s. per week, and if, for reasons before mentioned, 2s. be placed to the master's account, the remaining 5s. will amount to 10d. per week for each of the servants, &c. or per annum 2l. 3s. 4d.

The cleaning and management of the beds and other furniture, and the general superintendence of the house, may be estimated at 2s. per week.

Food

Food for Servants.—From the variety of constitutions, and other circumstances, the expense of diet cannot be very accurately estimated. Five shillings per week, as stated in the preceding table, is thought by some to be 6*d.* per week more than is consumed by an adult male servant, in ordinary cases, but the ale and extra food of hay time and harvest will supply that deficiency. Female servants may be estimated at 4*s.* per week for diet, as the lacc-makers, whose activity is less, and food somewhat inferior, commonly pay from 3*s.* to 3*s.* 6*d.* per week for their board only.

The food of a lad of twelve years may be estimated at 2*s.* 6*d.* per week.

Washing and Mending.—Male servants generally pay from 4*s.* to 5*s.* per quarter to some person in the neighbourhood for washing, &c. but in the case of female servants, it makes a part of their annual expense, as though they perform it themselves, their master must allow leisure for that purpose: the expense may be averaged at 1*d.* per day, or 1*l.* 10*s.* 5*d.* per annum.

General Expenses of Servants, &c.	House- keeper (or Mistress).	Kitchen or Dairy-maid.	Horse- keeper, or Man- servant.	Boy, 12 Years old.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Diet, 4 <i>s.</i> 4 <i>s.</i> 5 <i>s.</i> } 2 <i>s.</i> 6 <i>d.</i> per week, }	10 8 0	10 8 0	13 0 0	6 10 0
Wages,	10 10 0	5 5 0	10 10 0	2 12 0
Lodging, and wear and tear of furniture, .. }	1 6 0	1 6 0	1 6 0	1 6 0
Firing,	0 18 2½	0 18 2½	0 18 2½	0 18 2½
Cooking,	2 3 4	2 3 4	2 3 4	1 1 8
Washing, mend- ing, &c. }	1 10 5	1 10 5	..	..
Total per annum	26 16 0	21 11 0	27 17 6	12 7 10
Average per week	0 10 3½	0 8 3½	0 10 8½	0 4 9

In

In the management of a family, as in other cases, the housekeeper receives the highest wages, as the reward of skill and attention, rather than of labour.

In a family of seven persons, with the addition of a dairy of fifteen cows, it is supposed that the work of the dairy, cooking, management of furniture, &c. will furnish sufficient employment for the housekeeper or mistress, and a kitchen-maid, exclusive of washing and mending for the family: their united earnings will consequently be as follows :

Earnings of Housekeeper and Servant-girl.

Superintendence of house and dairy,	£. 5	4	0
Dairy work (fifteen cows),	19	5	2
Cooking, &c. for seven persons at 7s. per } week,	18	5	0
Management of beds and other furniture,	2	12	0
Washing and mending their own clothes, ..	3	0	10
	£. 48 7 0		

In calculating the earnings of a common day labourer, the quantity of food consumed in harvest cannot be estimated with much precision; but the extra labour of that period cannot be supported by the ordinary quantity of food.

Labourer's Earnings.—Harvest.

	£. s. d.	£. s. d.
Average month's pay, including } earnest, &c.	2 8 0	
One week finishing harvest, } thatching, &c.	0 9 0	
Two quarts of ale per day, for } five weeks,	0 15 0	
Extra ale, largess, &c.	0 2 0	
Small beer,	0 1 10½	
Meat of various sorts, but prin- } cipally pork, 3½lb. per week, } at 9d. per lb. (without } bones),	0 13 1½	
Cheese 1lb. per week, at 9d. } per lb.	0 3 9	
Brown bread or pudding, 1½lb. } per day,	0 8 9	
Plumbs, 1lb. for eight days, at } 8d. per lb.	0 2 11	
Salt, mustard, &c. ½d. per day,	0 1 5½	
Vegetables ditto,	0 1 5½	
Harvest home, food for the } men's families, three persons } in each,	0 3 0	
Cooking: a woman's work for } twelve men, at 2s. per day, }	0 5 10	
Firing for twelve persons, at 2s. } per week,	0 0 10	
Wood carting,	0 8 0	
Carry forward,	6 5 0	

Brought

guineas per annum, or more, are sometimes given by the large farmers in some parts of the county.

There is also reason to believe, that the care of horses is not so laborious as common day labour, and consequently the extra hours of confinement are little regarded by domestic servants.

Wear and Tear.

In this article much must be left to conjecture, but as the decay of implements, &c. forms a part of the expense of every operation in which horses are concerned, it was necessary to attempt to subdivide the expenses of iron work and wood work, in as regular a manner as possible among the various implements, as in the following table :

Wear and Tear of Implements.

Implements, with the Number of Years they may be supposed to last.	Prime Cost.	Annual radical Decay.	Annual Repairs.	Total Annual Expense.	Days of Employment per Ann.	Wear and Tear of 7 Hours, or per Day.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.		s.
Waggon, 25 years,	33 12 0	1 6 10	5 10	1 12 8	40	9½
Cart, 16 years, - -	16 16 0	1 1 0	4 6	1 5 6	45	6½
Framed roll, 21 years,	4 4	0 4 0	0 6	0 4 6	18	3
Common harrows, } 10 years, - - }	3 0 0	0 6 0	0 5 0	0 11 0	25	5½
Heavy harrow, -	5 10 0	—	—	—	—	—
Seuffer, - - -	9 0 0	—	—	—	—	—
Drill machine, - -	15 15 0	—	—	—	—	—
Com. plough, 2 years,	2 10 0	1 5 0	4 0	1 9 0	93½	7½
Sharpoint, 3 days,	0 0 7	...	...	1 7 2½	280 ploughs	—
coulterspoint, 6 days,	0 0 7	...	...	1 7 2½		—

A farm of 150 acres arable, is supposed to employ three ploughs, one roll, two pair of harrows, four carts,

carts, and one waggon. Heavy harrows, drills, and scufflers, not being in common use, are not regarded in this calculation.

The blacksmith's bill is supposed to be 1s. 8d. per acre, or 12l. 10s. on 150 acres. Of this sum 3l. 10s. is charged for the shoeing of seven horses, and 4l. 1s. 8d. for making the shar and coulter in 280 days work, or 93 $\frac{1}{2}$ for each plough.

The shar and coulter are supposed to cost 7d. each, the former twice, and the latter once a week.

The wheelwright's bill, as nearly as can be ascertained, amounts to 1s. per acre, or 7l. 10s. per annum on 150 acres. Such are the data on which the above table is founded, and it is hoped that the inferences will not be found to deviate far from the truth.

The implements are supposed to last something longer than some may suppose would be the case, under common management; but the value of the iron work, &c. of ruinous implements, should be included in the last years of their existence.

Expenses attending the various Kinds of Cattle.

In the elucidation of this subject, experiments are much wanted; but very few are to be met with in this county, except those that were planned and executed by that most eminent and patriotic Nobleman, whose premature death has contributed more, perhaps, than any event which ever happened, to retard the progress of scientific agriculture.

The first consideration seems to relate to the difference between the *local* and the *intrinsic* value of the various articles of cattle food.

Meadow and Clover Hay.—The latter of these articles is preferred for the use of horses, and generally produces the best price in the London market; but it is not known which is the most valuable for general purposes. The average price of hay is probably 3*s.* 6*d.* per cwt.; but as this is the price of what is called saleable hay, and there is much, in some seasons, of an inferior quality, it is probable that, on a general average of seasons, &c. the saleable price of hay does not exceed 3*s.* per cwt.

Three shillings per cwt. may therefore be considered as the local price of hay, viz. it is worth so much to a dairy-man in the spring of the year, when his own stock is consumed, and he finds it necessary to buy, to preserve his cows, &c. from starvation. It is worth 3*s.* per cwt. also to inn-keepers, &c.; but it would be a very erroneous supposition, that it is worth so much to the grower, either for the support of milking cows, or for any other purpose.

Farmers are in general restricted from selling hay, unless they buy two loads of manure for every ton of hay sold, to supply the supposed exhaustion from mowing the ground, and consuming the crop in another place.

The value of farm-yard manure seems to be considered at about 3*s.* per load or ton; but as this is seldom sold, its real value cannot be supposed to be well ascertained.

We are equally at a loss with respect to the relative value of the manure formed by different cattle. It seems proper therefore at present, to rely on the accuracy of the opinion, that the dung of sheep is worth as much as one-third of the value of their food, whether it consists of grass, turnips, or corn.

The

The intrinsic value of hay, for home consumption, will consequently be stated at 2*s.* 3*d.* per cwt.

Wheat, Barley, Beans, Oats, &c.—As the farmer is considered to have a right to sell all the corn that grows on the farm, the intrinsic value of it, if consumed at home, cannot be made a basis of calculation. There is reason to believe, if proper management be pursued in other respects, the sale of the corn—not excepting the oats, beans, and pease which are consumed by horses and pigs—will not reduce the value of the land. But, on the other hand, it is evident that a farmer who occupies his own estate, or who has confidence in the generosity of his landlord, will find his interest in consuming much of the produce of all kinds, in the support of cattle. There are several farmers who entertain a doubt, whether beans or pease can be profitably consumed by pigs at home; but a little reflection would lead to a contrary result.

A load of pease will produce as many pounds of pork, if given to pigs at home, as if they are consumed in the same way at ten miles distance; but the manure which is procured from the animals which consume them, is a material consideration, and is sometimes overlooked.

If a bushel of pease be worth 5*s.* it ought to make nearly a stone, or eight pounds of pork; and a person who has used many loads for the support of pigs, informs me, that he believes this is actually the case. Perhaps many may find a difficulty in believing, that the manure made by a bushel of pease can be worth 1*s.* 8*d.* or one-third of its value; but there is a strong probability that such is the case, notwithstanding the

great quantities of this manure which pass into ditches and rivers, and are thus entirely lost.

The manure of horses, when feeding on oats or beans, is of great value; but cannot, in the present state of agricultural knowledge, be made a subject of calculation.

Turnips, Cabbages, Potatoes, &c.—Turnips are generally fed upon the field where they grow, and consequently, the price which they can be sold for is their *intrinsic* value; but when appropriated to the use of the table, &c. their local value, including carriage, &c. is at least four times as much as the former.

The same arguments apply to cabbages, carrots, &c. Potatoes, as a considerable article in the food of man, may be expected to bear a high local price; but their *intrinsic* value, for the support of pigs, &c. will be determined by the weight of animal flesh which a certain number of bushels will produce. Some people suppose this would not be more than one pound of pork for one bushel of potatoes, but I have not heard that the experiment has been made in this county.

The culture of potatoes has been much recommended; but it is very doubtful if their merits as a cattle crop will ever bring them into general use. The expense of cultivating them is very considerable; but it should never be forgotten, that manure must be purchased, if they are used for human food, or exhaustion of the soil is a necessary consequence. If used in the support of pigs, sheep, &c. the soil will be improved rather than exhausted; but in this case, it is unknown whether their *intrinsic* value exceeds the expenses of cultivation.

Expense

Expense of Horses.

The interest of the purchase money is not considered in this place, as that seems more to belong to the final balance of the accounts; for if the interest of the capital were to be minutely attended to, it must consequently include a per centage on the labourers' weekly pay, and all other small items.

Attendance.—The extra hours of labour have been before estimated at 2s. per week, for 47 weeks, £.4. 15. 0. To these must be added the afternoons for the } 7. 1 0
same period, at 6d. each, or 3s. per week, }

Total, £.11 15 0

The rest of the horse-keeper's time is employed in ordinary labour, and, of course, belongs not to this account. A man is capable of attending six or seven horses without much difficulty; and when they are permitted to lie in the straw-yard at night, a helper is not much needed, though sometimes allowed.

It seems proper, therefore, to estimate the expense of attendance only at about 2l. per horse per annum.

Corn.—The allowance of corn is very various; but among the occupiers of soils not adapted to winter ploughing, the average will probably be found nearly as follows:

Oats, at 24s. per quarter (see *Comparison of Times*),
40 weeks, at one bushel and a half per week, £.9 0 0
12 weeks, at one bushel per week, 1 16 0

Total, £.10 16 0

Horses are not worked in general more than seven hours, or from six o'clock till one; but those who keep them in the field till two o'clock, find it necessary to allow more corn, or to mix oats with beans.

Chaff.—It is supposed, that working horses which are allowed the preceding quantity of corn, will consume 56 pounds of chaff in a week, half of which is hay, and the rest cavings, oat-straw, &c.

The expense of this article, valuing the hay at 2s. 3d. per cwt. and including the expense of chaff-cutting, &c. will amount to about 1s. 6d. per week for 32 weeks, and 6d. per week for 20 weeks in the summer.

Hay.—If a horse be kept entirely on hay, as is the practice of a few farmers in this county, the weekly consumption is supposed to amount to nearly three cwt. per week; and, if at constant work, it would probably be increased to 56 pounds per day.

Three cwt. per week amounts to 17l. 11s. per ann.

But a more common practice seems to be, to allow each horse about one ton of hay per annum, exclusive of what is cut into chaff.

Straw.—Cows are kept in the straw-yard in winter, to eat a portion of the straw, and tread the rest to dung, at 1s. 6d. per week. Tenants are generally restricted from selling straw; its intrinsic value, as cattle food, is therefore very trivial, and for the use of horses, may be estimated at 9d. per week, for 32 weeks.

Grass, Tares, &c.—The quantity of these and other articles which a horse will consume in a week, will be more or less, in consequence of a scanty or liberal allowance

ance of corn and chaff; but 4s. per week for each horse will probably deviate but little from the general average.

Decline in Value.—Some of the best farmers in the county contend, that by breeding of colts, or even buying them at three or four years old, and selling them again after a few years, money may be constantly gained by horses, as well as other cattle; and on a general average of the farmers, who are attentive or negligent in this branch of business, it is probable that the decline in the value of horses is about 1*l.* per head per annum.

Farriery.—This may perhaps amount to 7s. per horse, on an average.

Shoeing.—This has been stated, in some calculations, as high as 1*l.* 10s. per annum for each horse; but by a reference to some old blacksmiths' bills; it appears, that common farm-horses do not cost more than one-third of that sum, unless in unfavourable circumstances respecting roads, &c.

Repairs of Harness, &c.—It may perhaps be thought, that this article belongs more properly to the wear and tear; but it is difficult to draw a precise line of distinction, as in a minute view of the subject, the *shoeing, farriery, decline in value,* and even the *food* itself, belong to the same account.

The average expense, as nearly as can be ascertained by old bills, &c. amounts to about 10s. per annum for each horse.

Tax

Tax on Horses.—The tax on riding horses, so far as the common farmers are concerned, is as much a burden on agriculture as that on draught horses. If seven horses are employed, six of them will be charged at 12s. 6d. each, one at 2l. 8s. and 5s. for the groom! which, with the additional ten per cent. on the whole, makes for each horse, on an average, 1l. 1½d.

Recapitulation.

Attendance,	£.2	0	0
Corn, 40 weeks 1½ bushel, and 12 weeks } 1 bushel per week,	}	10	16 0
Chaff, 1s. 6d. for 32 weeks, and 6d. for } 20 weeks,			
Hay, one ton, exclusive of chaff,	2	5	0
Straw in the yard,	1	4	0
Grass, &c. 20 weeks, at 4s. per week,	4	0	0
Decline in value per annum,	1	0	0
Farriery, 7s. each per annum,	0	7	0
Shoeing,	0	10	0
Repairs of harness, &c.	0	10	0
Tax on horses, &c. average of 7 horses,	1	0	1½
Total per annum,	£.26	10	1½

Expense of Cows.

The quantity of food which is consumed by cows, as well as other animals, depends much on their age, size, constitution, &c. A satisfactory account of this subject can only be obtained from a great number of experiments; and such as have been made in this county, consisting chiefly of mixtures of food, as chaff composed of hay and straw, and turnips, oil-cake, and hay, afford no unequivocal ground of calculation.

In

In the experiment on chaff-cutting, the ten beasts ate eight cwt. of chaff in three days and a half.

Two small cows ate two cwt. of chaff per week per cow; two large ones ate considerably more.

There are no experiments to shew how much hay would have been consumed in the same time; but it seems to be the common opinion in Bedfordshire, as well as some other counties, that a milking cow will consume two cwt. of hay per week in winter. This coincides also with the opinion, that a horse will consume three cwt. of hay per week, if he has no corn, and that three cows consume as much as two horses.

In the account of hay consumed in six days by six oxen in regular work, belonging to the late Duke of Bedford, it appears, that 2 cwt. 2 qrs. 16 lb. was given to each ox; but the hay that was taken back reduces the quantity to 1 cwt. 3 qrs. 26 lb.

The quantity that was taken back, appears to be such as is called *orts* in Bedfordshire.

On the whole, it may be supposed that working oxen consume $2\frac{1}{2}$ cwt. of hay per week, or 56 lb. more than if they remained at their ease.

The adjustment price of fattening cows in the summer, is 3s. per week; but as giving milk is a species of work, a milch cow may be thought to consume at least one-sixth more than a fattening one.

The food of a calf is estimated at 1s. per day. After the first two or three weeks, such as are weaned are supported principally on skim-milk for two months. It is thought they consume two gallons per day of milk, which is worth 3d. per gallon.

During the rest of the year, their food probably is worth more than 1s. per week.

The expense of the second summer's food is commonly

monly 2s. per week, and in the winter it will be further increased, if kept on hay; but dry cattle are sometimes kept in the straw-yard in winter, at 1s. 6d. per head per week.

Attendance.—This article, including milking, foddering, cleaning cow-hovels, &c. may be estimated at $\frac{1}{4}$ d. per head per day.

Farriery.—This may probably amount to 4s. per head.

Hazards.—Some calculators have allowed 20s. per cow, under the head of decline in value; but this seems to me an impropriety. Where is the necessity, or propriety, of keeping milch cows that decline in value?

There is, however, a continual hazard of death from calving, and other causes, which, on the supposition of 1 in 56 being entirely lost, amounts to 5s. per head per annum.

The annual expense on a middle aged milch cow, will therefore stand as follows;

Grass in summer, 26 weeks, at 3s. 6d. per week,	} £. 4 11 0
Hay, 26 weeks, 2cwt. per week, at 2s. 3d. per cwt.	} 5 17 0
Attendance, as milking, &c. at $\frac{1}{4}$ d. per day, ..	1 2 10
Medicines, &c.	0 4 0
Hazard of death, one-fifty-sixth of value, ...	0 5 0
Total,	<u>£. 11 19 10</u>

Expense of Swine.

No experiments have been met with, which may serve to elucidate this subject; but the weekly expense of keeping

keeping a fatting pig, of six or seven months old, seems to be estimated, in the popular opinion, at from 3*s.* to 4*s.* and those of from 20 to 30 stone, at 6*s.* or 7*s.*

The hazard of life in this animal, probably does not exceed 2*s.* per annum.

The attendance consists in carrying the milk from the dairy, filling the troughs, littering and emptying the sties, which, together with the wear and tear of vessels, &c. may be estimated at 2*l.* per head per week, or 1*s.* 6*d.* for nine pigs, at the average age of six months.

Expense of Sheep.

The winter keep of *tegs*, whether consisting of turnips or grass, has commonly cost 4*d.* per week.

Fatting wethers are kept on turnips, at 8*d.* per head per week, and shear hogs at 7*d.* or 6*d.*

The value of the grass which a sheep consumes in summer, is little known; but the common supposition, that five sheep will eat as much as one cow, would warrant the charge of 7½*d.* per head per week for fatting sheep. Yet if this estimate was correct as applied to the Wiltshires, it ought to be considerably lower for the Leicesters and South Downs.

The hazard of life is more considerable in sheep than in any other animal, and as far as personal observation and the opinion of others may be depended on, the annual loss is more than five per cent.; but the skin, &c. diminishes the loss to about four per cent. or to 1*s.* per sheep on an average.

Shepherding.—This business, where a great portion of the sheep are folded, and kept on green tares, &c. in summer, and turnips in winter, will cost 1*s.* 6*d.* per sheep per annum, or 8*s.* per week for a flock of 277.

In

In this estimate, 7*l.* or 8*l.* of a servant's ordinary expense is supposed to be earned in other work, as milking, cutting thistles, hay, and harvest work, &c.

Fold.—182 sheep, in a fold of nine hurdles square, will occupy nearly one hour and an half of the shepherd's time in setting the fold, and driving backwards and forwards to the sheep-walks. The expense is consequently 3*d.* per head for half a year's folding. The value of the hurdles will be diminished one-third, or 18*s.* or about 1½*d.* per sheep. Hurdling sheep on tares will be done at nearly a similar expense, as also their winter management at turnips, with the addition of 6*d.* per head for picking the turnips out of the ground.

In the following tables, an attempt is made to give as systematic a view of the expense of breeding, &c. as the foregoing imperfect documents will admit of.

General View of the Expense of breeding Cattle.

Heads of Expense.	Horses.			Cows.			Sheep.			Swine.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
Sire, or male parent,	1	5	0	0	2	0	0	1	0	0	1	0
Hazard of value,	23	0	0	14	0	0	2	0	0	2	10	0
life in the } hazard per cent.	⅓			⅓			⅓			⅓		
mother, { value of risque,	0	9	0	0	5	0	0	1	0	0	1	0
Hazard of life in the off- } spring, first week, }	0	2	0	0	1	0	none, as some twins			average 8 pigs alive		
Expense, or loss attending pregnancy, as loss of flesh, strength, milk, work, or delay of fattening, }	1	0	0	0	15	0	0	3	0	0	5	0
Attendance,	0	2	0	0	1	0	0	0	6	0	1	0
Intrinsic value of the off-spring at a few days old, or prime cost,	2	18	0	1	4	6	0	5	6	0	8	0
The local or temporary value varies with times and circumstances, and with respect to colts and pigs, is unknown,	..			1	6	0	0	5	0	..		

General

General View of the Expense of Cattle, from their Birth to the Age of Two Years.

Time.	Horses.			Cows.			Sheep.			Swine.		
	Per Week.	Total.	d.	Per Week.	Total.	d.	Per Week.	Total.	d.	Per Week.	Total.	d.
Prime cost, - - - - -	May 1, 1800	£. 2 18	0	March 1, 1800	£. 2 10	0	Feb. 18, 1800	£. 0 5	0	-	-	0 1 0
The food of young animals is mostly mother's milk, and is considered as far more expensive than the mixtures of milk, grass, hay, straw, &c. with which they are afterwards supported.	1st month, 8 0	1 12	0	6 0	1 4	0	8	0 2	0	0 9	0 3 0	0 1 0
	2nd ditto, 3 0	1 4	0	3 6	0 14	0	8	0 2	0	1 0	0 4 0	0 1 0
	3d ditto, 3 0	0 12	0	1 0	0 4	0	7	0 2	0	1 3	0 5 0	0 1 0
	4th ditto, 2 0	0 8	0	1 0	0 4	0	6	0 2	0	1 6	0 6 0	0 1 0
	5th ditto, 2 0	0 8	0	1 0	0 4	0	6	0 2	0	1 9	0 7 0	0 1 0
	6th ditto, 2 0	0 8	0	1 0	0 4	0	5	0 1	0	2 0	0 8 0	0 1 0
	7th ditto, 1 6	0 6	0	1 0	0 4	0	4	0 1	0	3 0	0 12 0	0 1 0
	8th ditto, 1 6	0 6	0	1 0	0 4	0	4	0 1	0	3 6	0 14 0	0 1 0
	9th ditto, 1 6	0 6	0	1 0	0 4	0	4	0 1	0	4 0	0 16 0	0 1 0
	10th ditto, 1 6	0 6	0	1 0	0 4	0	4	0 1	0	4 6	0 18 0	0 1 0
	11th ditto, 1 6	0 6	0	1 0	0 4	0	4	0 1	0	5 0	0 1 0 0	0 1 0
	12th ditto, 2 0	0 8	0	1 0	0 4	0	4	0 1	0	5 6	1 2 0	0 1 0
	13th ditto, 2 6	0 10	0	1 0	0 4	0	4	0 1	0	6 0	1 4 0	0 1 0
Hazard of life, estimated by a per centage } on half their value, - - - - -	75	0 2 6	45	-	0 1	-	75	0 0 6	75	-	0 2 0	-
Attendance, as cleaning, folding, &c. - - - - -	-	0 10 0	-	-	0 5 0	-	-	0 1 0	-	-	0 8 8	-
Total expense for one year, - - - - -	-	10 10 6	-	-	6 18 0	-	-	1 9 8	-	-	8 10 8	-
Adjustments, &c. second year, - - - - -	5 months, 3 0	3 0	0	2 0	2 0	0	4	0 7 6	-	-	256 lb. at 8d.	-
	1 ditto, 3 6	0 14	0	2 6	0 10	0	4	0 1 6	-	-	-	-
	1 ditto, 4 0	0 16	0	2 6	0 10	0	5	0 1 6	-	-	-	-
	6 ditto, 4 0	4 16	0	2 6	3 0	0	-	0 11 0	-	-	-	-
Hazard of life, - - - - -	-	0 10 0	-	-	0 7 0	-	-	0 1 6	-	-	-	-
Attendance, &c. - - - - -	-	0 10 0	-	-	0 5 0	-	-	0 1 6	-	-	-	-
Expense of the second year's food, - - - - -	-	10 6 0	-	-	6 12 0	-	-	1 4 0	-	-	-	-
The average or intrinsic value at 2 years old, - - - - -	-	20 16 6	-	-	13 10 0	-	-	2 14 0	-	-	-	-

The foregoing tables are intended to shew the connection between the weekly expense of the food, and the value of the animal at the various periods of its growth; and though neither of these is well known, they may serve mutually to correct each other. In the first table several articles of expense are well known, the rest are consequently theoretical, or common opinions, clothed as it were in figures. The expenses which attend animals previous to their birth, are certainly not imaginary, however little they may be known or attended to, and if any article of expense, however trivial, be neglected, it throws an undue weight on the rest, and consequently engenders or fosters erroneous opinions.

Some people seem to think that the food of a young lamb costs but little; not considering that the lamb devours all the food of the mother in shape of milk, and even causes her to eat more than usual, or to decline in flesh and condition.

Were these and other circumstances, which demand a minute inquiry, to be omitted in the estimates of expenses, it would sometimes appear, as has too frequently been the case, that the farmer is in possession of a commodity, a fat lamb for instance, worth 30*s.* which, in his own opinion, perhaps has not cost more than 10*s.* This supposition is commonly deduced from a superficial theory, or rather from no theory at all, and the first attempt to exhibit the opinion in figures, would probably prove it fallacious and delusive, and also point out the precise article in which opinion and fact are at variance. In a strict sense, every animal ought to be worth more than the value of the food which it has consumed, as the master's gains should be supposed to be derived from every article,
accord-

in which case it is always necessary to make use of four horses, and sometimes five or six, on the strong clays. Mr. Foster, of Bedford, thinks that about three roods per day, is the average quantity that is ploughed on the clay soils in the north of the county.

In ploughing an acre of ground in nine inch furrows, the horses walk eleven miles, exclusive of turning at the land's ends, which, together with the half mile journeys to and from the work, will scarcely amount to thirteen miles, or two miles per hour, for six hours and a half of work.

If only three roods be ploughed in a day, the horses will consequently walk little more than one mile and a half per hour.

As many will suppose this to be a low estimate of the labour of horses, it may be observed, that the hindrances of every kind that occur when the soil is hard, foul, or dirty, are considerable, and other reasons will perhaps appear in the sequel, that may induce the belief that Mr. Foster's estimate is not far from the truth.

The calculations on ploughing will, therefore, be founded on the supposition that the first ploughing, or fallowing, is commonly performed by four horses, with a man to hold and a boy to drive, and all other ploughings on clay soils with three horses, with a holder and driver as before. On sandy soils, three horses are generally employed, and though the ploughing may be equally well performed with two stout horses a-breast, it is found rather too laborious on hilly ground. The ploughing of light soils will therefore be estimated after the rate of two horses and a half, with a holder and driver to each plough, without attending to the minute distinctions of first and second plough-

ploughings, when the land is dry or wet, clean or foul, &c.

Harrowing.—A pair of harrows will clear about nine times as much ground in each draught as a plough, and employ either two or three horses, and a man and boy.

The average expense of the team, may be stated at two horses and a half, and an ordinary day's work will be eight acres, once harrowed.

Scuffling, or heavy Harrowing.—Employs four horses, and a man and boy. The common scufflers will scarcely work six acres in a forenoon; and though the large harrows may do two acres more work, it will be much less effectual for most occasions.

Rolling.—Ten acres seems to be an average day's work, with a roller between seven and eight feet in length. Two horses and a man are generally employed, though sometimes only one on a level soil, and with a moderate sized roller.

Carriage of Corn and Manure.—The carriage in harvest is generally performed by two horses in each cart; but in the carriage of manure, three horses are sometimes employed, in case of bad roads, &c.

On a farm of the size to which these calculations are more particularly adapted, it is a matter of choice, whether two or three horses be employed in the draught of a load of corn or manure, consequently, either three or four carts will be used at a time, according to circumstances, but the quantity of work performed in either case, depends so much on the size of the loads, &c.

that it will vary very much less than many might suppose from a superficial view of the subject.

The average distance to which corn and manure is carted, on a farm of 150 acres arable, is nearly half a mile. The carriage in harvest appears to occupy about seventeen minutes per cart-load, consequently 24 loads may be carried to the stack-yard in six hours and 48 minutes, exclusive of meals; and in this time the horses will have earned as much at least as in a *journey* at plough. In a harvest day, however, from 30 to 40 loads of corn may be carried, and the average quantity per acre, including the wheat haulm, seems to be about five moderate cart-loads. Clover-hay will not exceed four loads per acre.

The carriage of a load of manure seems to occupy on an average about thirteen minutes, or 32 loads may be carried in six hours 56 minutes. This quantity will be sufficient for two acres, at sixteen loads per acre, and if each load be distributed in ten heaps, they will be precisely one pole asunder. Of the thirty acres of fallow, ten will be folded by 100 sheep, and twenty manured, as above mentioned, with cart dung, which, if equally distributed over the whole, would amount to nearly eleven loads per acre. In arable farms of 150 acres, about two-thirds of the corn is laid in the stack-yard, and is taken into the barns occasionally in the winter; the growth of four acres is probably removed from the stacks to the barns in six hours, or a winter's forenoon, and two horses are generally employed when the rick-yard is in the most convenient position.

The carriage of corn to markets, mills, &c. generally employs four horses, and a man and boy, and the load consists of the produce of two acres and a half of ground, on the average, when the seed is deducted,

or

or from eight to ten loads or quarters; and as seed is frequently procured at a distance, no exception need be made on account of the corn which is consumed at home.

The farmer who does not study much economy, will keep a nag in addition to the seven farm horses; but it is probable that about fifty days' work of one horse are necessarily employed in the market business of the arable part of the farm.

Various casualties and incidental jobs may be supposed to employ the seven horses three days in the year, and the hedges will probably employ them at least one day.

Highway Duty.—This employs three horses and two men six days for each 50*l.* rent.

The Quantity of Tillage on various Soils.—In the unenclosed parishes, the clay fallows are seldom ploughed more than three times previous to wheat or barley sowing; and on some of the woodland clays, still less tillage is given; but it is presumed that such as adopt the five years' course, as in the imaginary farm, will not omit to plough the land four times at the least. One-third of the fallow is supposed to be sown with tares; but the quantity of tillage is not much increased, and indeed sometimes lessened, on their account; which shews the great imprudence of sowing them where the land is foul.

Light land fallows are generally ploughed in the winter, and four times afterwards; including the turnip-seed earth, though by the use of the scuffler, one ploughing may be avoided. It is not common to plough more than once in Bedfordshire, immediately previous to sowing any kind of corn.

The scuffler is not generally in use, but heavy harrows are sometimes employed in lieu of it.

It is not common to harrow clay fallows, except the part which is sown with tares; but it ought not to be omitted where the fallows are four or five years a-part. I shall therefore calculate on one scuffling, or two common harrowings instead of it, and two other harrowings on clay fallows. The turnip fallows on foul sandy land, will require four scufflings and eight harrowings. Barley land is commonly harrowed three times, and once for covering the clover seed.

Clover-ley wheat demands four harrowings on an average, and the succeeding beans or pease should be harrowed three times.

The roll is seldom employed on clay fallows, except on account of the tares; but the average employment of this implement may probably be stated as follow:

<i>Strong Soils.</i>	<i>Times.</i>	<i>Light Soils.</i>	<i>Times.</i>
Fallow and tares,	1	Fallow and turnips,	3
Barley,	1	Barley,	1
Clover,	1	Seeds,	1
Wheat,	2	Seeds,	0
Beans or pease,	1	Wheat,	2
		Pease,	1

A General View of the Employment of Horses on 150 Acres, Five Years' Course.

	Years of the Course.	Number of Horses in each Team.	Number of Acres in each Season.	Number of Times.	Total single Acres	Average Days' Work each Team.	Number of Days' Work of 7 Hours	Number of Horses singly employed.	Days' Work for 7 Horses.
					acres.				
Ploughing, - -	fallow	4	30	1	30	—	40	160	125½
	barley	3	30	1	30	0 ½	120	360	
	wheat	3	30	1	30	0 ½	40	120	
Scaffling, - -	beans	3	30	1	30	0 ½	40	120	2½
	fallow	4	30	1	30	6	5	20	
	fallow	2½	30	2	60	8	7½	18½	
Harrowing, - -	barley	2½	30	3	90	8	11½	28½	17½
	clover	2½	30	1	30	8	3½	9	
	wheat	2½	30	4	120	8	15	37	
Rolling, - -	beans	2½	30	3	90	8	11½	28½	5½
	fallow	2	30	1	30	10	3	6	
	barley	2	30	1	30	10	3	6	
	clover	2	30	1	30	10	3	6	
	wheat	2	30	2	60	10	6	12	
	beans	2	30	1	30	10	3	6	
	Years of the Course.	Horses in each Team or Set.	Acres in each Season.	Loads per Acre.	Number of Loads.	Average Days' Work of 7 Hours, in Acres.	Number of Days' Work of 7 Hours.	Number of Horses employed.	
Carriage of manure, -	fallow	7	30	16	320	2	10	70	10
Harvest carriage, including haulm, -	barley	7	30	5	150	5	6	42	23
	clover	7	30	4	120	6	5	35	
	wheat	7	30	5	150	5	6	42	
Rick-yard carriage, two-thirds of the corn,	beans	7	30	5	150	5	6	42	4½
	barley	2	30	5	100	4	5	10	
	wheat	2	30	5	100	4	5	10	
Market carriage, -	beans	2	30	5	100	4	5	10	20½
	barley	4	30	—	—	2	12	48	
	wheat	4	30	—	—	2	12	48	
Market nag, - -	- -	1	150	—	—	3	50	50	7½
Highway duty, - -	- -	3	150	—	—	8½	18	54	7½
Hedges, farm-roads, and casualties, - }	- -	7	—	—	—	—	4	28	4
Total of horse labour (which leaves 85 days idle, besides Sundays),									227½

No account has been taken of the horse-labour attending thirty acres of pasture; but if this, together with the carriage of materials for repairs, and various small matters too tedious to enumerate, should occupy the teams two weeks and four days in the year, the days in which the horses will be employed will be 244 per annum, or two-thirds of the whole, and consequently they must earn in two days, as much as they consume in three, which, at 26*l.* 10*s.* 1½*d.* per annum, will amount to nearly 2*s.* 2*d.* per day per horse. In the employment of horses for hire, the interest of their prime cost and annual consumption, which is 49*s.* 6*d.* should be charged; and this, estimated by the above rule, amounts to 4½ or 2*s.* 6½*d.* per day of seven hours, for a horse's labour, which is 0½*d.* higher than they are rated in popular opinion.

At this rate, however, a farmer who lends a horse, gains no more than the interest of his capital.

In the Surveys of Norfolk and Essex, it appears that light land farms, whatever may be their extent, are seldom tilled with fewer horses than four to 100 acres, while the clays require five, and often six.

It is obvious, therefore, that seven horses are *necessary* to perform the ordinary tillage of 150 acres of the clays of Bedfordshire; and consequently the estimates of their labour that have been given, will scarcely be thought to deviate far from the real practice of the farmers.

The Expense of the principal Articles of Human Labour.

Burning of Couch-Grass.—This weed is so abundant on sandy land, after the common six years' course,

as

as to cause very frequently an expense of 2s. per acre in human labour.

Clodding and Guttering.—The open field farmers who sow wheat after summer fallows, seldom take any trouble to make the soil break into small pieces previous to wheat-sowing, as this is supposed to increase the May-weed, scratch-burs, &c. consequently a dry autumn causes much expense in breaking the clods with spades, hoes, &c. This may sometimes amount to 5s. but more commonly 2s. 6d. per acre. The same operations on clover-ley wheat may be stated at 1s. 6d. on heavy soils, and 1s. on sands or gravels. The same operations on the other corn crops cost about 1s. per acre.

Weeding and Horing.—The expense of weeding is extremely variable. The crops of wheat which succeed fallows could not, in some seasons, be properly cleaned for 10s. per acre; in other cases the expense is very trivial.

The wheat crops which succeed clover are supposed the least liable to weeds, but this is not always the case, especially on light soils. The average may perhaps be found nearly as follows: wheat after fallows on clay, 3s. 6d. per acre; on strong land clover-ley, 2s. ditto; light land, 3s.; and barley, oats, beans, in general, 3s. per acre.

Weeding of clover-leys may cost perhaps 1s. per acre in the extirpation of *thistles, docks, &c.*

Turnips are hoed once over at about 7s. 6d. per acre, including two quarts of ale. Two hoeings would cost 12s.

Broad-cast corn is not often hoed in this county; but
set

set beans are hoed at about 8*s.* per acre. Pease frequently cost 5*s.* or even 6*s.* per acre, where the land is foul with couch-grasses; but in light friable soils, containing only annual weeds, either wheat or pease may be hand-hoed at 4*s.* per acre, as a man will hoe half an acre in a common day's work.

Manuring.—Where neither straw nor manure are purchased, the value of dung per load makes no part of the account. The carriage occupies either two or three drivers, average two and a half; and four men are employed in filling and spreading, which together with throwing into heaps, may be stated as follows:

Heaping,	1 <i>d.</i> per load.
Filling,	1½ <i>d.</i>
Spreading,	1 <i>d.</i>
	3½ <i>d.</i>

At sixteen loads per acre, this part of the expense amounts to 4*s.* 8*d.* per acre for twenty acres, or 3*s.* 1½*d.* each, if equally divided among the thirty acres of fallow.

The expense of folding, as far as admits of calculation, is stated in another place at 4½*d.* per sheep, or 3*s.* 6½*d.* per acre; but this is included in the general charge for shepherding. This is properly the expense of the carriage of sheep-dung, but it is not the whole expense, as the *wear and tear* of those “living dung carts” (the sheep) ought to be included.

Seed and Sowing.—A great part of the corn is sown by the master himself, on most of the moderate farms of Bedfordshire, and a loss is frequently sustained by entrusting

trusting this operation to careless servants. It is worth perhaps 4*d.* per acre, but as more than this is gained by saving the carriage and market charges on the seed corn, this expense will not be attended to, but the seed charged at the average market price. (See *Comparison of Times*). Pease in this neighbourhood are commonly worth more than beans, but this does not appear to be the case in the county at large.

A General View of the Quantity and the Value of Seed, on light and heavy Soils.

Sorts.	Value per Bushel.		Quantity per Acre on	Expense of Seed per Acre.			Quantity per Acre on Sand.	Expense of Seed per Acre.		
	<i>s.</i>	<i>d.</i>	<i>bushels.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>	<i>bushels.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
Wheat,	8	9	2½	1	1	10½	3	1	6	3
Rye,	5	4½	....	....	....	....	3	0	16	0½
Barley,	4	3½	4	0	17	2	4	0	17	2
Oats,	3	0	4	0	12	0	5	0	15	0
Beans,	5	0½	4	1	0	2	....	....	....	....
Pease,	5	0½	3½	0	17	7½	4	1	0	2
Tares,	6	0	3	0	18	0	3	0	18	0
Rye-grass,	4	0	....	....	....	....	1	0	4	0
	<i>Per lb.</i>		<i>lbs.</i>				<i>lbs.</i>			
Red clover,	0	6	16	0	8	0	10	0	5	0
White clover,	0	10	10	0	8	4	6	0	5	0
Trefoil,	0	3	....	....	....	....	4	0	1	0
Turnips,	1	0	....	....	....	....	2	0	2	0
—, Swedish,	1	6	....	....	....	....	2	0	3	0

Tares will be sown on the clay fallows once in three years; the annual expense is therefore one bushel, or 6*s.* per acre per annum, over the whole of the fallows.

Reaping,

Reaping, Mowing, &c.—The expense of a harvestman, during the first month, appears from the estimates before given, to amount to 4s. 3d. per day; and as it is generally supposed that a company of men will reap about half an acre each per day, the expense of this operation is 8s. 6d. per acre.

The price, when left by the acre, varies from 7s. to 14s. or 15s. Cutting of the haulm or wheat stubble, costs about 1s. 6d. per acre, and may be included in the harvest account; it is indeed sometimes performed in the time of harvest by those who have neglected to provide straw for the thatching the stacks of corn. The expense of rye is similar to that of wheat.

Beans, barley, and oats, seem to be mowed after the rate of two acres per day, on an average, and will therefore be charged 2s. 2d. per acre. Pease are sometimes mowed, but occasionally cut with hooks; the average expense of the latter mode, may probably amount to 6s. per acre.

Gathering, &c.—Under this term it is intended to include the various operations which take place previous to loading and carrying to the stacks or barns.

Wheat is bound in sheaves, and placed in *shocks* of ten, or twelve in each, at about 2s. per acre. Haulm is raked into heaps, or *cocks*, at about 9d. per acre, which added to the cutting, makes the whole expense of haulming 2s. 3d. per acre.

Barley, or oats, are cocked and dragged ready for the cart, with some allowance for turning it over in wet weather, or when it is mixed with green clover, at about the same cost as it is mown, namely, five men will clear ten acres per day.

The process of *wadding*, and gleaning beans, with the

the turnings that are sometimes required, is rather a tedious one, and seems to cost as much as 6*s.* per acre.

Pease may be made ready for the cart at about 1*s.* 6*d.* per acre; and 6*d.* per acre may be added to the expense of every species of corn, on account of ill weather, which sometimes causes much additional trouble and delay. Harvest has been known to last nine weeks at Liddington.

Harvest-Carriage.—In the carriage of corn, ten men are commonly employed, viz. four at the stack, and sometimes five, when large ones are made; three drivers, two to drag after the cart, and one to *pitch* or put the corn on the cart.

There are sometimes more than ten persons employed in this business, but the charge of 2*s.* 2*d.* or a trifle more than half a harvest day's work each, for ten men, is apparently very near the actual expense incurred in human labour, in clearing five acres of barley, oats, or pease. This amounts to 4*s.* 4*d.* per acre. In the carriage of beans, thirteen persons are commonly employed, in consequence of gleaning after the cart, &c.; the expense is therefore about 5*s.* 8*d.* per acre.

Eight persons are commonly sufficient in the carriage of wheat, and the expense, including the stubble, is nearly 3*s.* 6*d.* per acre.

Thatching.—A field of fifteen acres, when laid on one stack, appears to occupy two men about one day in covering it securely with thatch, and these, together with the four *yelmers* and *servers*, cost about 20*s.* per day. To this may be added about 2*s.* 6*d.* on account of the men and horses employed in removing of straw, and sometimes cutting haulm and carting it from the field. It has been before mentioned, that
in

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in a farm of 150 acres arable, about two-thirds of the corn is laid in the *rick-yard*; the expense of thatching may therefore be averaged at 1s. per acre. In some small farms, where the buildings are more numerous, the expense does not amount to 6d., and in some large ones it may amount to 14d. or 16d. per acre.

Harvesting of one Crop of Clover.—This is performed at the time when the daily pay of a labourer is 2s. 1d. including beer, and may be stated nearly as follows:

Three turnings, &c. at 6d. per acre. Cocking and dragging, five men to ten acres. Carrying, ten men, at six acres per day, of seven hours, at 1s. 4d. per man. Thatching, at 6d. per acre. The hours of horse labour are stated for the sake of regular calculation, though they sometimes work fourteen hours in a harvest day.

A general view of the expense of harvest, may be seen in the following table.

Expense of Harvest.

	Barley.		Red Clover.		Wheat.		Beans.		Pease.		
	s.	d.	s.	d.	£.	s.	d.	s.	d.	s.	d.
Cutting by sickle or scythe, - - -	-	-	-	-	0	8	6	-	-	6	0
Gathering, turning, &c. - -	2	2	2	3	0	1	6	2	2	-	-
Human labour in cartage, -	2	8	2	6½	0	3	3	6	6	2	0
Thatching, - - -	4	4	2	2½	0	3	6	5	8	4	4
	1	0	0	6	0	1	0	1	0	1	0
Total amount of human labour,	10	2	7	5½	0	17	9	15	4	13	4
Horse-labour, - - -	3	0½	2	6½	0	3	0½	3	0½	3	0½
Wear and tear, - - -	0	5½	0	4½	0	0	5½	0	5½	0	5½
Total expense, - - -	13	8	10	4½	1	1	3	18	10	16	10

The total amount of human labour, in harvesting the three principal crops in the five years' course, is 43s.

43s. 3d. or for the whole 90 acres, 64l. 9s. 2d. By the previous estimates of labourers' earnings, it appears that a harvest-man earns 6l. 5s. in five weeks, or performs all the labour belonging to 10.38 acres, and personal experience and observation suggest no idea of its incorrectness.

It is true, some farmers in this, as well as other counties, assign twelve or even fourteen acres to each harvest-man, but this depends much on the kinds of cropping, as is sufficiently obvious. Much of the wheat is often reaped by *acre-men*; those who are hired only for a month, frequently return before the ricks are thatched, and sometimes leave much corn in the field in wet weather.

Add to this the carters and other house servants, whose aid is a material object, though it has sometimes been omitted; and the above calculation will be found only nominally to differ from those where thirteen or fourteen acres are assigned to each man.

Carriage to Barns from the Stacks.—Six men are employed in this business, at 1s. each, which, according to the foregoing estimates, would be exactly 1s. per acre for all the corn which is harvested; but the removals of straw, &c. and the custom of giving the men a dinner occasionally at such times, will increase the expense to 1s. 2d. per acre for oats, barley, beans, and pease, though wheat and rye, being of less bulk, when the haulm is deducted, will not cost more than 1s. per acre.

Thrashing and Dressing.—The average expense which attends the separation of the corn from the straw
and

and chaff, with other small incidents, is exhibited in the following table, as nearly as can be ascertained from observation, and the opinion of others.

*The Expense of Thrashing and Dressing Corn, &c.
per Acre.*

	Bushels per Acre.	Thrashing per Bushel.			Thrashing per Acre.			Dressing & Loads, or 40 Bushels.			Total Ex- pense per Acre.		
		s.	d.		£.	s.	d.	£.	s.	d.	£.	s.	d.
Wheat,	25	0	5	0	10	5	0	3	0	0	12	3	½
Rye,	25	0	5	0	10	5	0	3	0	0	12	3	½
Beans,	25	0	3	0	6	3	0	2	0	0	7	6	
Pease,	25	0	3	0	6	3	0	2	0	0	7	6	
Tares,	20	0	4	0	6	8	0	2	0	0	7	8	
Barley,	36	0	3½	0	10	6	0	2	3	0	12	6	¼
Oats,	40	0	3	0	10	0	0	2	0	0	12	0	
Clover-seed,	3	9	0	1	7	0	1	3	4	1	8	9	

The above quantities are not given as the average produce of a farm of 20s. per acre; but there is reason to believe, that if the quantity of produce be found deficient in consequence of the growth of weeds, or other causes, the expense of thrashing the crop will, nevertheless, suffer little, if any diminution.

Expenses of Sale, &c.—The market charges are about 3s. per day for fifty days, or 1s. per acre over 150 acres arable. The customary deductions of payment on account of *sack-carrying*, &c. amount to about 6d. per acre; but as the farmer saves something in house-keeping while absent at market, the real expense cannot be stated at more than 1s. per acre on the whole.

Depredations and Losses.—Injuries from the cattle
of

of neighbouring farmers, bankruptcies, fires, floods, &c. will be estimated on the whole at 6*d.* per acre, or 3*l.* 15*s.* on the farm of 150 acres.

Attendance of Sheep, &c.—If 100 sheep be kept on 150 acres, the expense of shepherding, as before estimated, is 1*s.* per acre, and the wear and tear of hurdles will be fourpence per acre, or the price of three dozen and a half, at 15*s.* per dozen.

Casualties.—There often occur certain accidental jobs, which cannot be foreseen, and these probably cause an expense of 6*d.* per acre in human labour.

Rent and Tithes.—The average rent of land in this county, which is exonerated from tithes, is probably near 20*s.* per acre.—According to the practice in modern enclosures, the tithes are, in fact, the rent of one-fifth of the arable land.

Poor's-rates.—The general average of the county of Bedford, as ascertained by the Act of Parliament of 1803, is 3*s.* 9½*d.* in the pound rent on the rated rental; but as several parishes are not rated according to the modern rent, it is probable that the true rate in the pound does not exceed 3*s.* 6*d.*

Income Tax.—The tenant's duty, which is nominally 1*s.* 6*d.* in the pound, is reduced to 1*s.* 3½*d.* by the discount of one-eighth, on account of tithes.

Window Tax, &c.—The tax for eleven windows, including that for a yard-dog, amounts to nearly 6*d.* in the pound.

BEDS.]

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Fences.

Fences.—The consideration of the expenses and profits of fences, and the ground they occupy, may be here inserted, though it is necessarily made a distinct article, that the ploughing, reaping, &c. might be calculated according to statute acres, without any deductions. The fences on the imaginary farm of which a plan has been given, extend through the length of 1320 poles, which is 7.33 poles of fencing to each acre; and according to the supposition that each fence occupies four yards in width, the quantity of ground to be deducted from each acre on this account, is 5.33 square poles, which is sufficient to produce one bushel of corn on the average. Hedges are commonly cut every twelve years: the expense of cutting, laying, ditching, with occasional repairs, and a faggot for every day's work, is about 8*d.* per pole, or 73*s.* 4*d.* for 110 poles, which is nearly 5*d.* per acre per annum over the whole farm.

A good double-row hedge will produce a sufficiency of wood to make 120 faggots for every fourteen poles in length, or about 800 per annum on the farm in question.

Making the faggots, costs 3*s.* per hundred, and they are worth about 23*s.*

The Expenses and Profits of the Hedges of 150 Acres Arable, and 30 Pasture.

One-thirtieth of the Farm allowed for Hedges.	Expense per Acre of 220 whole 6 Acres. Poles by 4 Yards.					
	£.	s.	d.	£.	s.	d.
Rent and tithes,	1	0	0	6	0	0
Poor-rates,	0	3	6	1	1	0
Income-tax,	0	1	3½	0	7	10½
Window-tax, &c.	0	0	6	0	3	0
Highway duty,	0	1	1	0	6	6
Cutting hedges, &c.	0	12	2½	3	13	4
Faggoting, 700, at 3s.	0	3	6	1	1	0
Total per annum,	2	2	1½	12	12	8½
	Produce.			Produce.		
Faggots, 700, at 1l. 3s.	1	6	10	8	1	0
Bushes, 1 load, at 1l.	0	3	4	1	0	0
Sheep-feed,	0	7	0	2	2	0
Total produce,	1	17	2	11	3	0
Loss per acre, which is nearly 2d. } per acre on the whole farm, .. }	0	4	11½	1	9	8½

Roads.—The regular expense which attends ground which is used for farm roads is 1l. 6s. 4½d. per acre, as above, but the cost of sand, gravel, &c. for mending them will not be inquired into in this place. The expense of levelling the cart-ruts, &c. will not be less than 5s. per acre; and if the value of the herbage is 20s. per acre, the loss will amount to 11s. 4½d. or 19s. 6d. on the whole length of the road.

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In the formation of the tables of agricultural expenses, some of the most complicated subjects have been previously calculated, and arranged in the following tables.

The Expense of various Articles of Tillage, &c.

	Human Labour.	Horse Labour.	Wear and Tear.	Total per Acre.
	s. d.	s. d.	s. d.	s. d.
Fallowing, one man, one boy, four horses, three roods per day	9 0	11 6½	0 9½	14 4½
Common ploughing, three horses, three roods, clay soil	2 0	8 8	0 9½	11 5½
Average ploughing on sand, two horses and a half, one acre per day	1 6	5 5	0 7½	7 6½
Ploughing on sand, double horse-team, one acre	1 0	4 4	0 7½	5 11½
Scuffling, or double harrowing	0 9½	1 4	0 1½	1 8
Common harrowing	0 9½	0 8	0 0½	0 11
Rolling	0 1½	0 5½	0 0½	0 6½
Carriage of manure per real acre (Two-thirds of fallow) average	1 3	7 7	1 1½	9 11½
Carriage of { Clover	2 2½	2 6½	0 4½	5 1½
{ Wheat	3 8	3 0	0 5½	7 0
Carriage of { Beans	5 8	3 0	0 5½	9 2
{ Other corn	4 4	3 0	0 5½	7 10
Carriage to barns { Wheat	1 0	6 7	0 2	1 9
{ Other corn	1 2	0 8½	0 2½	2 1
Carriage to market	0 7½	2 5½	0 4	4 4½
Marketing	1 0	0 8	0 2	1 10½
Highway duty	0 3	0 9½	0 0½	1 1
Casualties	0 6	0 3½	0 0½	0 10

The Expenses which vary with the Rent, adapted to Soils of different Value.

	s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes	15 0	1 0 0	1 5 0	1 10 0	1 15 0
Poor's-rates	2 7½	0 3 6	0 4 4½	0 5 3	0 6 1½
Income tax	1 0	0 1 3½	0 1 7½	0 1 11½	0 2 3½
Highway duty { men	0 2½	0 0 3	0 0 3½	0 0 4½	0 0 5½
{ horses	0 7	0 0 9½	0 0 11½	0 1 1½	0 1 4½
{ wear & tear	0 0½	0 0 0½	0 0 1	0 0 1½	0 0 1½
Total	19 5½	1 5 10½	1 12 4½	1 18 10½	2 5 4

Tables of Agricultural Expenses.

Table I. Common Five Years' Clover Course. Clay Soil.

Succession of Crops.	Fallow, one-third Tares.	Barley.	Red Clo- ver.	Wheat.	Beans.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes - - -	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0
Poor's rates - - -	0 3 6	0 3 6	0 3 6	0 3 6	0 3 6
Income tax - - -	0 1 3	0 1 3	0 1 3	0 1 3	0 1 3
Window tax, &c. - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Highway { men - - -	0 0 3	0 0 3	0 0 3	0 0 3	0 0 3
duty { horses - - -	0 0 9	0 0 9	0 0 9	0 0 9	0 0 9
{ wear and tear - -	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Fallowing { men - - -	0 2 0	—	—	—	—
{ horses - - -	0 11 6	—	—	—	—
{ wear and tear - -	0 0 9	—	—	—	—
Other plough- { men - - -	0 6 0	0 2 0	—	0 2 0	0 2 0
ings { horses - - -	1 6 0	0 8 8	—	0 8 8	0 8 8
{ wear & tear - - -	0 2 5	0 0 9	—	0 0 9	0 0 9
Scuffling, or { men - - -	0 0 2	—	—	—	—
heavy { horses - - -	0 1 4	—	—	—	—
harrowing { wear and tear - -	0 0 1	—	—	—	—
{ men - - -	0 0 4	0 0 6	0 0 2	0 0 0	0 0 6
Harrowing { horses - - -	0 1 4	0 2 0	0 0 8	0 2 8	0 2 0
{ wear and tear - -	0 0 1	0 0 2	0 0 0	0 0 3	0 0 2
Rolling { men - - -	0 0 1	0 0 1	0 0 1	0 0 2	0 0 1
{ horses - - -	0 0 5	0 0 5	0 0 5	0 0 10	0 0 5
{ wear and tear - -	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Carrriage of ma- { men - - -	0 0 10	—	—	—	—
nure { horses - - -	0 5 0	—	—	—	—
{ wear & tear - - -	0 0 9	—	—	—	—
Turning, filling, spreading, &c.	0 3 1	—	—	—	—
Value of seed (and sowing)	0 6 0	0 17 2	0 8 0	1 1 10	1 0 2
Quantity of seed - -	1 bush.	4 bush.	16 lbs.	2½ bush.	4 bush.
Couch burning, &c. clod- ding and guttering {	—	0 1 0	—	0 1 6	0 1 0
Weeding, hoeing - - -	—	0 3 0	0 1 0	0 2 0	0 3 0
Reaping, mowing - - -	—	0 2 2	0 2 3	0 10 0	0 2 2
Binding, cocking - - -	—	0 2 8	0 2 6	0 3 3	0 6 6
Thatching of ricks, &c. -	—	0 1 0	0 0 6	0 1 0	0 1 0
Harvest car- { men - - -	—	0 4 4	0 2 2	0 3 6	0 5 8
riage, includ- { horses - - -	—	0 3 0	0 2 6	0 3 0	0 3 0
ing haulm { wear & tear - - -	—	0 0 5	0 0 4	0 0 5	0 0 5
Carrriage to { men - - -	—	0 1 2	—	0 1 0	0 1 2
barus from the { horses - - -	—	0 0 8	—	0 0 7	0 0 8
stack-yard { wear & tear - - -	—	0 0 2	—	0 0 2	0 0 2
Thrashing, &c. - - -	—	0 12 6	—	0 12 3	0 7 6
Expenses of { men - - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
sale, &c. { horses - - -	0 0 8	0 0 8	0 0 8	0 0 8	0 0 8
{ wear & tear - - -	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2
Carrriage to { men - - -	—	0 0 7	—	0 0 7	0 0 7
market, { horses - - -	—	0 3 5	—	0 3 5	0 3 5
&c. { wear and tear - -	—	0 0 4	—	0 0 4	0 0 4
Casualties { men - - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
{ horses - - -	0 0 3	0 0 3	0 0 3	0 0 3	0 0 3
{ wear and tear - -	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Depredations and losses -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Attendance of sheep - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Wear and tear of hurdles -	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4
Total expense - - -	4 19 6	4 19 7	4 11 9	5 12 3	5 2 8
Average expense per acre -	4 13 2	4 13 2	4 13 2	4 13 2	4 13 2

Table II. *Course in the North of Bedfordshire. Poor, cold, wet Clay.*

Succession of Crops.		Fallow, one-third Tares.	Barley.	Beans.	Wheat.
		£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes	- - -	0 15 0	0 15 0	0 15 0	0 15 0
Poor's-rates	- - -	0 2 7½	0 2 7½	0 2 7½	0 2 7½
Income tax	- - -	0 1 0	0 1 0	0 1 0	0 1 0
Window tax, &c.	- - -	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty	{ men	0 0 2½	0 0 2½	0 0 2½	0 0 2½
	{ horses	0 0 7	0 0 7	0 0 7	0 0 7
	{ wear and tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Fallowing	{ men	0 2 0	—	—	—
	{ horses	0 11 6½	—	—	—
	{ wear and tear	0 0 9½	—	—	—
Other ploughings	{ men	0 6 0	0 2 0	0 2 0	0 4 0
	{ horses	1 6 0	0 8 8	0 8 8	0 17 4
	{ wear and tear	0 2 5	0 0 9	0 0 9½	0 1 7½
Scuffling, or heavy harrowing	{ men	0 0 2½	—	—	0 0 2½
	{ horses	0 1 4	—	—	0 1 4
	{ wear and tear	0 0 1½	—	—	0 0 1½
Harrowing	{ men	0 0 4½	0 0 6½	0 0 6	0 0 6½
	{ horses	0 1 4	0 2 0	0 2 0	0 2 0
	{ wear and tear	0 0 1½	0 0 2½	0 0 2½	0 0 2½
Rolling	{ men	0 0 1½	0 0 1½	0 0 1½	0 0 1½
	{ horses	0 0 5½	0 0 5½	0 0 5½	0 0 5½
	{ wear and tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Carriage of manure	{ men	0 0 10	—	—	—
	{ horses	0 5 0½	—	—	—
	{ wear and tear	0 0 9	—	—	—
Turning, filling, spreading	- - -	0 3 1½	—	—	—
Value of seed (and sowing)	- - -	0 6 0	0 17 2	1 0 2	1 1 10½
Quantity of seed	- - -	1 bush.	4 bush.	4 bush.	2½ bush.
Couch burning, &c. clodding and guttering	- - -	—	0 1 0	0 1 0	0 2 6
Weeding or hoeing	- - -	—	0 3 0	0 3 0	0 3 6
Reaping, mowing,	- - -	—	0 2 2	0 2 2	0 10 0
Binding, cocking, &c.	- - -	—	0 2 8	0 6 6	0 3 3
Thatching of ricks, &c.	- - -	—	0 1 0	0 1 0	0 1 0
Harvest carriage, in- cluding haulm	{ men	—	0 4 4	0 5 8	0 3 6
	{ horses	—	0 3 0½	0 3 0½	0 3 0½
	{ wear and tear	—	0 0 5½	0 0 5½	0 0 5½
Carriage to barns from the stack- yard	{ men	—	0 1 2	0 1 2	0 1 0
	{ horses	—	0 0 8½	0 0 8½	0 0 7
	{ wear and tear	—	0 0 2½	0 0 2½	0 0 2
Thrashing, &c.	- - -	—	0 12 6½	0 7 6	0 12 3½
Expenses of sale, &c.	{ men	0 1 0	0 1 0	0 1 0	0 1 0
	{ horses	0 0 8½	0 0 8½	0 0 8½	0 0 8½
	{ wear and tear	0 0 2	0 0 2	0 0 2	0 0 2
Carriage to market, &c.	{ men	—	0 0 7½	0 0 7½	0 0 7½
	{ horses	—	0 3 5½	0 3 5½	0 3 5½
	{ wear & tear	—	0 0 4	0 0 4	0 0 4
Casualties	{ men	0 0 6	0 0 6	0 0 6	0 0 6
	{ horses	0 0 3½	0 0 3½	0 0 3½	0 0 3½
	{ wear and tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Depredations and losses	- - -	0 0 6	0 0 6	0 0 6	0 0 6
Attendance of sheep	- - -	0 1 0	0 1 0	0 1 0	0 1 0
Wear and tear of hurdles	- - -	0 0 4	0 0 4	0 0 4	0 0 4
Total expense	-	4 13 1½	4 13 1½	4 16 3½	6 0 0

Table III. *Course of single Corn Crops. Poor, cold, wet Clay.*

Succession of Crops.		Fallow.	Wheat (or Bar- ley).	Seeds.	Seeds.	Oats.
		£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes	-	0 15 0	0 15 0	0 15 0	0 15 0	0 15 0
Poor's rates	-	0 2 7½	0 2 7½	0 2 7½	0 2 7½	0 2 7½
Income tax	-	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Window tax, &c.	-	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty	men	0 0 2½	0 0 2½	0 0 2½	0 0 2½	0 0 2½
	horses	0 0 7	0 0 7	0 0 7	0 0 7	0 0 7
	wear & tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Fallowing	men	0 2 0	—	—	—	—
	horses	0 11 6½	—	—	—	—
	wear & tear	0 0 9½	—	—	—	—
Other plough- ings	men	0 6 0	0 2 0	—	—	0 2 0
	horses	1 6 0	0 8 8	—	—	0 8 8
	wear & tear	2 5 0	0 0 9½	—	—	0 0 9½
Scuffling, or heavy har- rowing	men	0 0 2½	—	—	—	—
	horses	0 1 4	—	—	—	—
	wear & tear	0 0 1½	—	—	—	—
Harrowing	men	0 0 4½	—	0 0 2½	—	0 0 9
	horses	0 1 4	—	0 0 8	—	0 2 8
	wear & tear	0 0 1½	—	0 0 0½	—	0 0 3
Rolling	men	—	0 0 1½	0 0 1½	—	0 0 1½
	horses	—	0 0 5½	0 0 5½	—	0 0 5½
	wear & tear	—	0 0 0½	0 0 0½	—	0 0 0½
Carriage of ma- nure	men	0 0 10	—	—	—	—
	horses	0 5 0½	—	—	—	—
	wear & tear	0 0 9	—	—	—	—
Turning, filling, spreading	-	0 3 1½	—	—	—	—
Value of seed (and sowing)	-	—	1 1 10½	0 13 0	—	0 12 0
Quantity of seed	-	—	2½ bush.	Ray, half bush. R. clover, 10lb. W. clover, 5lb. Trefl. H. 4lb.	—	4 bush.
Couch burning, &c. clod- ding and guttering	-	—	0 2 6	—	—	0 1 0
Weeding or hoeing	-	—	0 3 6	0 1 0	0 1 0	1 3 0
Reaping, mowing	-	—	0 10 0	—	—	0 2 2
Binding, cocking, &c.	-	—	0 3 3	—	—	0 2 8
Thatching of ricks, &c.	-	—	0 1 0	—	—	0 1 0
Harvest car- riage, includ- ing haulm	men	—	0 3 6	—	—	0 4 4
	horses	—	0 3 0½	—	—	0 3 0½
	wear & tear	—	0 0 5½	—	—	0 0 5½
Carriage to barns from the stack-yard	men	—	0 1 0	—	—	0 1 2
	horses	—	0 0 7	—	—	0 0 8½
	wear & tear	—	0 0 2	—	—	0 0 2½
Thrashing, &c.	-	—	0 12 3½	—	—	0 12 0
Expenses of sale, &c.	men	0 1 0	0 1 0	0 1 0	0 1 0	1 1 0
	horses	0 0 8½	0 0 8½	0 0 8½	0 0 8½	0 0 8½
	wear & tear	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2
Carriage to mar- ket, &c.	men	—	0 0 7½	—	—	0 0 7½
	horses	—	0 3 5½	—	—	0 3 5½
	wear & tear	—	0 0 4	—	—	0 0 4
Casualties	men	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
	horses	0 0 3½	0 0 3½	0 0 3½	0 0 3½	0 0 3½
	wear & tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Depredations and losses	-	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Attendance of sheep	-	0 1 0	0 1 0	0 1 0	0 1 0	1 1 0
Wear and tear of hurdles	-	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4
Total expense	-	1 7 1½	1 4 1½	1 19 1½	1 5 6	1 8 4½

Table IV. Common Open Field Course. Clay Soils.

Succession of Crops.	Fallow.	Wheat or Barley alternately.			Beans or Oats alternately.		
		£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes	-	0 15 0	0 15 0	0 15 0	0 15 0	0 15 0	0 15 0
Poor's-rates	-	0 2 7½	0 2 7½	0 2 7½	0 2 7½	0 2 7½	0 2 7½
Income tax	-	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Window tax, &c.	-	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty	{ men	0 0 2½	0 0 2½	0 0 2½	0 0 2½	0 0 2½	0 0 2½
	{ horses	0 0 7	0 0 7	0 0 7	0 0 7	0 0 7	0 0 7
	{ wear and tear	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Fallowing	{ men	0 2 0	—	—	—	—	—
	{ horses	0 11 6½	—	—	—	—	—
	{ wear and tear	0 0 9½	—	—	—	—	—
Other ploughings	{ men	0 6 0	0 2 0	0 2 0	0 2 0	0 2 0	0 2 0
	{ horses	1 6 0	0 8 8	0 8 8	0 8 8	0 8 8	0 8 8
	{ wear & tear	0 2 5	0 0 9½	0 0 9½	0 0 9½	0 0 9½	0 0 9½
Scuffling, or heavy harrowing	{ men	—	—	—	—	—	—
	{ horses	—	—	—	—	—	—
	{ wear and tear	—	—	—	—	—	—
Harrowing	{ men	—	—	0 0 6½	0 0 6½	0 0 6½	0 0 6½
	{ horses	—	—	0 2 0	0 2 0	0 2 0	0 2 0
	{ wear and tear	—	—	0 0 2½	0 0 2½	0 0 2½	0 0 2½
Rolling	{ men	—	—	0 0 1½	0 0 1½	0 0 1½	0 0 1½
	{ horses	—	—	0 0 5½	0 0 5½	0 0 5½	0 0 5½
	{ wear and tear	—	—	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Carriage of manure	{ men	0 0 10	—	—	—	—	—
	{ horses	0 5 0½	—	—	—	—	—
	{ wear and tear	0 0 9	—	—	—	—	—
Turning, filling, spreading	-	0 3 1½	—	—	—	—	—
Value of seed (and sowing)	-	—	1 1 10½	0 17 2	1 0 2	0 12 0	—
Quantity of seed	-	—	2½ bush.	4 bush.	4 bush.	4 bush.	—
Couch burning, &c. clodding, and guttering	{ men	—	0 2 6	0 1 0	0 1 0	0 1 0	—
	{ horses	—	0 3 6	0 3 0	0 3 0	0 3 0	—
	{ wear and tear	—	0 10 0	0 2 2	0 2 2	0 2 2	—
Weeding or hoeing	-	—	0 3 3	0 2 8	0 6 6	0 2 8	—
Reaping, mowing	-	—	0 1 0	0 1 0	0 1 0	0 1 0	—
Binding, cocking, &c.	-	—	0 3 6	0 4 4	0 5 8	0 4 4	—
Thatching of ricks, &c.	{ men	—	0 8 0½	0 3 0½	0 8 0½	0 3 0½	—
	{ horses	—	0 0 5½	0 0 5½	0 0 5½	0 0 5½	—
	{ wear & tear	—	0 1 0	0 1 2	0 1 2	0 1 2	—
Harvest carriage, including hauln	{ men	—	0 0 7	0 0 8	0 0 8	0 0 8	—
	{ horses	—	0 0 7	0 0 8	0 0 8	0 0 8	—
	{ wear & tear	—	0 0 2	0 0 2	0 0 2	0 0 2	—
Carriage to barns from the stack-yard	-	—	0 12 3½	0 12 6½	0 7 6	0 12 0	—
Thrashing, &c.	-	—	0 1 0	0 1 0	0 1 0	0 1 0	—
Expenses of sale, &c.	{ men	0 0 8½	0 0 8½	0 0 8½	0 0 8½	0 0 8½	—
	{ horses	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2	—
	{ wear & tear	—	0 0 7½	0 0 7½	0 0 7½	0 0 7½	—
Carriage to market, &c.	{ men	—	0 3 5½	0 3 5½	0 3 5½	0 3 5½	—
	{ horses	—	0 0 4	0 0 4	0 0 4	0 0 4	—
	{ wear and tear	—	0 0 6	0 0 6	0 0 6	0 0 6	—
Casualties	{ men	0 0 3½	0 0 3½	0 0 3½	0 0 3½	0 0 3½	—
	{ horses	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	—
	{ wear and tear	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	—
Depredations and losses	-	—	0 1 0	0 1 0	0 1 0	0 1 0	—
Attendance of sheep	-	—	0 0 4	0 0 4	0 0 4	0 0 4	—
Wear and tear of hurdles	-	—	—	—	—	—	—
Total expense	-	3 0½ 5	3 6½ 4	13 1½ 4	16 5½ 4	7 5½ 4	—

Table V. *Common Five Years' Clover Course. Gravelly Loams, &c.*

Succession of Crops.		Turnips.			Barley.			Red Clover.			Wheat.			Pease.		
		£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
Rent and tithes	-	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
Poor's rates	-	0	3	6	0	3	6	0	3	6	0	3	6	0	3	6
Income tax	-	0	1	3	0	1	3	0	1	3	0	1	3	0	1	3
Window tax, &c.	-	0	0	6	0	0	6	0	0	6	0	0	6	0	0	6
Highway duty	{ men	0	0	3	0	0	3	0	0	3	0	0	3	0	0	3
	{ horses	0	0	9	0	0	9	0	0	9	0	0	9	0	0	9
	{ wear & tear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fallowing	{ men	0	1	6	—	—	—	—	—	—	—	—	—	—	—	—
	{ horses	0	5	5	—	—	—	—	—	—	—	—	—	—	—	—
	{ wear & tear	0	0	7	—	—	—	—	—	—	—	—	—	—	—	—
Other ploughings	{ men	0	6	0	0	1	6	—	—	—	0	1	6	0	1	6
	{ horses	1	1	8	0	5	5	—	—	—	0	5	5	0	5	5
	{ wear & tear	0	2	5	0	0	7	—	—	—	0	0	7	0	0	7
Scuffling, or heavy harrowing	{ men	0	0	11	—	—	—	—	—	—	—	—	—	—	—	—
	{ horses	0	5	4	—	—	—	—	—	—	—	—	—	—	—	—
	{ wear & tear	0	0	5	—	—	—	—	—	—	—	—	—	—	—	—
Harrowing	{ men	0	1	6	0	0	6	0	0	2	0	0	9	0	0	6
	{ horses	0	5	4	0	2	0	0	0	8	0	2	8	0	2	0
	{ wear & tear	0	0	6	0	0	2	0	0	0	0	0	3	0	0	2
	{ men	0	0	13	0	0	1	0	0	1	0	0	2	0	0	1
Rolling	{ horses	0	1	3	0	0	5	0	0	5	0	0	10	0	0	5
	{ wear & tear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carriage of manure	{ men	0	0	10	—	—	—	—	—	—	—	—	—	—	—	—
	{ horses	0	5	0	—	—	—	—	—	—	—	—	—	—	—	—
	{ wear & tear	0	0	9	—	—	—	—	—	—	—	—	—	—	—	—
Turning, filling, spreading	-	0	3	1	—	—	—	—	—	—	—	—	—	—	—	—
Value of seed (and sowing)	-	0	2	0	0	17	2	0	8	0	1	6	3	1	0	2
Quantity of seed	-	2 lb.	4 bush.	16 lbs.	3 bush.	4 bush.										
Couch burning, &c.	-	0	2	0	—	—	—	—	—	—	—	—	—	—	—	—
Clodding and guttering	-	—	—	—	—	—	—	—	—	—	0	1	0	—	—	—
Weeding or hoeing	-	0	12	0	0	3	0	0	1	0	0	3	0	0	3	0
Reaping, mowing	-	—	—	—	0	2	2	0	2	3	0	10	0	0	6	0
Binding, cocking, &c.	-	—	—	—	0	2	8	0	2	6	0	3	3	0	2	0
Thatching of ricks, &c.	-	—	—	—	0	1	0	0	0	6	0	1	0	0	1	0
Harvest carriage, including haulm	{ men	—	—	—	0	4	4	0	2	2	0	3	6	0	4	4
	{ horses	—	—	—	0	3	0	0	2	6	0	3	0	0	3	0
	{ wear & tear	—	—	—	0	0	5	0	0	4	0	0	5	0	0	5
Carriage to barns from the stack-yard	{ men	—	—	—	0	1	2	—	—	—	0	1	0	0	1	2
	{ horses	—	—	—	0	0	8	—	—	—	0	0	7	0	0	8
	{ wear & tear	—	—	—	0	0	2	—	—	—	0	0	2	0	0	2
Thrashing, &c.	-	—	—	—	0	12	6	—	—	—	0	12	3	0	7	6
Expenses of sale, &c.	{ men	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
	{ horses	0	0	8	0	0	8	0	0	8	0	0	8	0	0	8
	{ wear & tear	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2
Carriage to market, &c.	{ men	—	—	—	0	0	7	—	—	—	0	0	7	0	0	7
	{ horses	—	—	—	0	3	5	—	—	—	0	3	5	0	3	5
	{ wear & tear	—	—	—	0	0	4	—	—	—	0	0	4	0	0	4
Casualties	{ men	0	0	6	0	0	6	0	0	6	0	0	6	0	0	6
	{ horses	0	0	7	0	0	7	0	0	7	0	0	7	0	0	7
	{ wear & tear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depredations and losses	-	0	0	6	0	0	6	0	0	6	0	0	6	0	0	6
Attendance of sheep	-	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
Wear and tear of hurdles	-	0	0	4	0	0	4	0	0	4	0	0	4	0	0	4
Total expense	-	5	10	0	4	14	7	2	11	9	5	13	2	1	15	9

BEDS.]

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Table VI. *Common Six Years' Course. Sandy Loams.*

Succession of Crops.	Turnips.	Barley.	Seeds.	Seeds.	Wheat.	Pease.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes - - -	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0
Poor's-rates - - -	0 3 6	0 3 6	0 3 6	0 3 6	0 3 6	0 3 6
Income tax - - -	0 1 3½	0 1 3½	0 1 3½	0 1 3½	0 1 3½	0 1 3½
Window tax, &c. - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty { men - - -	0 0 3	0 0 3	0 0 3	0 0 3	0 0 3	0 0 3
{ horses - - -	0 0 9½	0 0 9½	0 0 9½	0 0 9½	0 0 9½	0 0 9½
{ wear and tear - - -	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Fallowing { men - - -	0 1 6	—	—	—	—	—
{ horses - - -	0 5 5	—	—	—	—	—
{ wear and tear - - -	0 0 7½	—	—	—	—	—
Other ploughings { men - - -	0 6 0	0 1 6	—	—	0 1 6	0 1 6
{ horses - - -	1 1 8	0 5 5	—	—	0 5 5	0 5 5
{ wear & tear - - -	0 2 5	0 0 7½	—	—	0 0 7½	0 0 7½
Scuffing, or { men - - -	0 0 11	—	—	—	—	—
heavy { horses - - -	0 5 4	—	—	—	—	—
harrowing { wear and tear - - -	0 0 5	—	—	—	—	—
Harrowing { men - - -	0 1 6	0 0 6½	0 0 2½	—	0 0 9	0 0 6½
{ horses - - -	0 5 4	0 2 0	0 0 8	—	0 2 8	0 2 0
{ wear and tear - - -	0 0 6	0 0 2½	0 0 0½	—	0 0 3	0 0 2½
Rolling { men - - -	0 0 3½	0 0 1½	0 0 1½	—	0 0 2½	0 0 1½
{ horses - - -	0 1 3½	0 0 5½	0 0 5½	—	0 0 10	0 0 5½
{ wear and tear - - -	0 0 0½	0 0 0½	0 0 0½	—	0 0 0½	0 0 0½
Carriage of manure { men - - -	0 0 10	—	—	—	—	—
{ horses - - -	0 5 0½	—	—	—	—	—
{ wear and tear - - -	0 0 9	—	—	—	—	—
Turning, filling, spreading -	0 3 1½	—	—	—	—	—
Value of seed (and sowing) -	0 2 0	0 17 2	0 15 0	—	1 6 3	1 0 2
Quantity of seed - - -	2 lb.	4 bush.	Ray, 1lb. R. clover, 10lb. W. clover, 6lb. Tretail, 4lb.	—	3 bush.	4 bush.
Couch burning, &c. - -	0 2 0	—	—	—	—	—
Clodding and guttering - -	—	—	—	—	0 1 0	—
Weeding or hoeing - - -	0 12 0	0 3 0	0 1 0	0 1 0	0 3 0	0 3 0
Reaping, mowing - - -	—	0 2 2	0 2 3	—	0 10 0	0 6 0
Binding, cocking, &c. - -	—	0 2 8	0 2 6	—	0 3 3	0 2 0
Thatching of ricks, &c. - -	—	0 1 0	0 0 6	—	0 1 0	0 1 0
Harvest carriage { men - - -	—	0 4 4	0 2 2½	—	0 3 6	0 4 4
{ horses - - -	—	0 3 0½	0 2 6½	—	0 3 0½	0 3 0½
{ wear & tear - - -	—	0 0 5½	0 0 4½	—	0 0 5½	0 0 5½
Carriage to { men - - -	—	0 1 2	—	—	0 1 0	0 1 2
{ horses - - -	—	0 0 8½	—	—	0 0 7	0 0 8½
{ wear & tear - - -	—	0 0 2½	—	—	0 0 2	0 0 2½
Thrashing, &c. - - -	—	0 12 6½	—	—	0 12 3	0 7 6
Expenses of { men - - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
sale, &c. { horses - - -	0 0 8½	0 0 8½	0 0 8½	0 0 8½	0 0 8½	0 0 8½
{ wear & tear - - -	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2
Carriage to { men - - -	—	0 0 7½	—	—	0 0 7½	0 0 7½
market, { horses - - -	—	0 3 5½	—	—	0 3 5½	0 3 5½
&c. { wear and tear - - -	—	0 0 4	—	—	0 0 4	0 0 4
Casualties { men - - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
{ horses - - -	0 0 3½	0 0 3½	0 0 3½	0 0 3½	0 0 3½	0 0 3½
{ wear and tear - - -	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Depredations and losses - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Attendance of sheep - - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Wear and tear of hurdles - -	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4
Total expense - - -	5 10 0	4 14 7½	2 18 9½	1 11 11½	5 13 2½	4 15 9½

Table VII. *Occasional open-field Course. Poor light Sand.*

Succession of Crops.	Turnips.		Barley.		Oats.		Red Clover.		Wheat.		Pease.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Rent and tithes - - -	0	15 0	0	15 0	0	15 0	0	15 0	0	15 0	0	15 0
Poor's-rates - - -	0	2 7½	0	2 7½	0	2 7½	0	2 7½	0	2 7½	0	2 7½
Income tax - - -	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0
Window tax, &c. - -	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6
Highway { men - - -	0	0 2½	0	0 2½	0	0 2½	0	0 2½	0	0 2½	0	0 2½
duty { horses - - -	0	0 7	0	0 7	0	0 7	0	0 7	0	0 7	0	0 7
{ wear and tear - -	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½
Following { men - - -	0	1 6	—	—	—	—	—	—	—	—	—	—
{ horses - - -	0	5 5	—	—	—	—	—	—	—	—	—	—
{ wear and tear - -	0	0 7½	—	—	—	—	—	—	—	—	—	—
Other plough- { men - - -	0	6 0	0	1 6	0	1 6	—	—	0	1 6	0	1 6
ings { horses - - -	1	1 8	0	5 5	0	5 5	—	—	0	5 5	0	5 5
{ wear & tear - - -	0	2 5	0	0 7½	0	0 7½	—	—	0	0 7½	0	0 7½
Scuffling, or { men - - -	0	0 11	—	—	—	—	—	—	—	—	—	—
heavy { horses - - -	0	5 4	—	—	—	—	—	—	—	—	—	—
harrowing { wear and tear - -	0	0 5	—	—	—	—	—	—	—	—	—	—
Harrowing { men - - -	0	1 6	0	0 6½	0	0 6½	0	0 2½	0	0 9	0	0 6½
{ horses - - -	0	5 4	0	2 0	0	2 0	0	0 8	0	2 8	0	2 0
{ wear and tear - -	0	0 6	0	0 2½	0	0 2½	0	0 0	0	0 3	0	0 2½
Rolling { men - - -	0	0 3½	0	0 1½	0	0 1½	0	0 1½	0	0 2½	0	0 1½
{ horses - - -	0	1 3½	0	0 5½	0	0 5½	0	0 5½	0	0 10½	0	0 5½
{ wear and tear - -	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½
Carriage of { men - - -	0	0 10	—	—	—	—	—	—	—	—	—	—
manure { horses - - -	0	5 0½	—	—	—	—	—	—	—	—	—	—
{ wear and tear - -	0	0 9	—	—	—	—	—	—	—	—	—	—
Turning, filling, spreading -	0	3 1½	—	—	—	—	—	—	—	—	—	—
Value of seed (and sowing) -	0	2 0	0	17 2	0	15 0	0	8 0	1	6 3	1	0 2
Quantity of seed - - -	2 lb.	—	4 bush.	—	5 bush.	—	16 lb.	—	3 bush.	—	4 bush.	—
Couch burning, &c. - -	0	2 0	—	—	—	—	—	—	—	—	—	—
Clodding and guttering - -	—	—	—	—	—	—	—	0	1 0	—	—	—
Weeding or hoeing - - -	0	12 0	0	3 0	0	3 0	0	1 0	0	3 0	0	3 0
Reaping, mowing, - - -	—	—	0	2 2	0	2 2	0	2 3	0	10 0	0	6 0
Binding, cocking, &c. - -	—	—	0	2 8	0	2 8	0	2 6	0	3 3	0	2 0
Thatching of ricks, &c. - -	—	—	0	1 0	0	1 0	0	0 6	0	1 0	0	1 0
Harvest car- { men - - -	—	—	0	4 4	0	4 4	0	2 2½	0	3 6	0	4 4
riage, includ- { horses - - -	—	—	0	3 0½	0	3 0½	0	2 6½	0	3 0½	0	3 0½
ing haulm { wear & tear - -	—	—	0	0 5½	0	0 5½	0	0 4½	0	0 5½	0	0 5½
Carriage to { men - - -	—	—	0	1 2	0	1 2	—	—	0	1 0	0	1 2
barns from the { horses - - -	—	—	0	0 8½	0	0 8½	—	—	0	0 7	0	0 8½
stack-yard { wear & tear - -	—	—	0	0 2½	0	0 2½	—	—	0	0 2	0	0 2½
Thrashing, &c. - - -	—	—	0	12 6½	0	12 0	—	—	0	12 3½	0	7 6
Expenses of { men - - -	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0
sale, &c. { horses - - -	0	0 8½	0	0 8½	0	0 8½	0	0 8½	0	0 8½	0	0 8½
{ wear & tear - - -	0	0 2	0	0 2	0	0 2	0	0 2	0	0 2	0	0 2
Carriage to { men - - -	—	—	0	0 7½	0	0 7½	—	—	0	0 7½	0	0 7½
market, { horses - - -	—	—	0	3 5½	0	3 5½	—	—	0	3 5½	0	3 5½
&c. { wear & tear - -	—	—	0	0 4	0	0 4	—	—	0	0 4	0	0 4
Casualties { men - - -	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6
{ horses - - -	0	0 3½	0	0 3½	0	0 3½	0	0 3½	0	0 3½	0	0 3½
{ wear & tear - -	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½	0	0 0½
Depredations and losses - -	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6	0	0 6
Attendance of sheep - - -	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0	0	1 0
Wear and tear of hurdles - -	0	0 4	0	0 4	0	0 4	0	0 4	0	0 4	0	0 4
Total expense - - -	5	3 7½	4	8 2	4	5 5½	2	5 4	5	6 10	4	9 4½

Table VIII. *Course for Sheep-feeding. Poor light Sands.*

Succession of Crops.	Turnips.	Barley.	Seeds.	Seeds.	Oats.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes - - -	0 15 0	0 15 0	0 15 0	0 15 0	0 15 0
Poor's-rates - - -	0 2 7½	0 2 7½	0 2 7½	0 2 7½	0 2 7½
Income tax - - -	0 1 0	0 1 3	0 1 0	0 1 0	0 1 0
Window tax, &c. - - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty { men - - -	0 0 2½	0 0 2½	0 0 2½	0 0 2½	0 0 2½
{ horses - - -	0 0 7	0 0 7	0 0 7	0 0 7	0 0 7
{ wear and tear - - -	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Fallowing { men - - -	0 1 6	—	—	—	—
{ horses - - -	0 5 5	—	—	—	—
{ wear and tear - - -	0 0 7½	—	—	—	—
Other plough-ings { men - - -	0 6 0	0 1 6	—	—	0 1 6
{ horses - - -	1 1 8	0 5 5	—	—	0 5 5
{ wear & tear - - -	0 2 5	0 0 7½	—	—	0 0 7½
Scuffling, or heavy harrowing { men - - -	0 0 11	—	—	—	—
{ horses - - -	0 5 4	—	—	—	—
{ wear and tear - - -	0 0 5	—	—	—	—
Harrowing { men - - -	0 1 6	0 0 6½	0 0 2½	—	0 0 9
{ horses - - -	0 5 4	0 2 0	0 0 8	—	0 2 8
{ wear and tear - - -	0 0 6	0 0 2½	0 0 0½	—	0 0 3
Rolling { men - - -	0 0 3½	0 0 1½	—	—	0 0 2½
{ horses - - -	0 1 3½	0 0 5½	—	—	0 0 10½
{ wear and tear - - -	0 0 0½	0 0 0½	—	—	0 0 0½
Carriage of manure { men - - -	0 0 10	—	—	—	—
{ horses - - -	0 5 0½	—	—	—	—
{ wear & tear - - -	0 0 9	—	—	—	—
Turning, filling, spreading - - -	0 3 1½	—	—	—	—
Value of seed (and sowing) - - -	0 2 0	0 17 2	0 15 0	—	0 15 0
Quantity of seed - - -	2 lb.	4 bush.	Ray, 1 bush. Red clov. 10 lb. White clov. 6 lb. Trefoil, 4 lb.		5 bush.
Couch burning, &c. - - -	0 2 0	—	—	—	—
Clodding and guttering - - -	—	—	—	—	—
Weeding or hoeing - - -	0 12 0	0 3 0	0 1 0	0 1 0	0 3 0
Reaping, mowing - - -	—	0 2 2	—	—	0 2 2
Binding, cocking - - -	—	0 2 8	—	—	0 2 8
Thatching of ricks, &c. - - -	—	0 1 0	—	—	0 1 0
Harvest carriage, including haulm { men - - -	—	0 4 4	—	—	0 4 4
{ horses - - -	—	0 3 0½	—	—	0 3 0½
{ wear & tear - - -	—	0 0 5½	—	—	0 0 5½
Carriage to barns from the stack-yard { men - - -	—	0 1 2	—	—	0 1 2
{ horses - - -	—	0 0 8½	—	—	0 0 8½
{ wear & tear - - -	—	0 0 2½	—	—	0 0 2½
Thrashing, &c. - - -	—	0 12 6½	—	—	0 12 0
Expenses of sale, &c. { men - - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
{ horses - - -	0 0 8½	0 0 8½	0 0 8½	0 0 8½	0 0 8½
{ wear & tear - - -	0 0 2	0 0 2	0 0 2	0 0 2	0 0 2
Carriage to market, &c. { men - - -	—	0 0 7½	—	—	0 0 7½
{ horses - - -	—	0 3 5½	—	—	0 3 5½
{ wear and tear - - -	—	0 0 4	—	—	0 0 4
Casualties { men - - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
{ horses - - -	0 0 3½	0 0 3½	0 0 3½	0 0 3½	0 0 3½
{ wear and tear - - -	0 0 0½	0 0 0½	0 0 0½	0 0 0½	0 0 0½
Depredations and losses - - -	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6
Attendance of sheep - - -	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Wear and tear of hurdles - - -	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4
Total expense - - -	5 3 7½	4 8 2	2 1 5	1 5 6	4 6 1½

The Expense of various Modes of Cropping, mostly derived from the preceding Tables.

Rent, &c.							Averages.
s.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
20 {	Fallow, 1-3d tares	Barley	R. Clover	Wheat	Beans		
	4 19 6½	4 19 7	2 11 9½	5 12 3½	5 2 8½	—	4 13 2½
20 {	Fallow, 1-3d tares	Barley	R. Clover	Wheat			
	4 19 6½	4 19 7	2 11 9½	5 12 3½	—	—	4 10 9½
15 {	Fallow, 1-3d tares	Barley	Beans	Wheat			
	4 13 1½	4 13 1½	4 16 3½	6 0 0	—	—	5 0 7½
15 {	Fallow	Wheat	Seeds	Seeds	Oats		
	4 7 1½	5 4 1½	1 19 11½	1 5 6	4 8 4½	—	3 9 0
15 {	Fallow	Wheat	Oats	Fallow	Barley	Beans	
	4 3 0½	5 3 6½	4 7 5½	4 3 0½	4 13 1½	4 16 2½	4 11 1
15 {	Fallow, 1-3d tares	Wheat	Fallow, 1-3d tares	Barley			
	4 13 1½	5 3 6½	4 13 1½	4 13 1½	—	—	4 15 8½
20 {	Fallow, 1-3d tares	Wheat	Fallow, 1-3d tares	Barley			
	4 19 6½	5 10 0	4 19 6½	4 19 7	—	—	5 2 2
20 {	Turnips	Barley	R. Clover	Wheat	Pease		
	5 10 0	4 14 7½	2 11 9½	5 13 2½	4 15 9½	—	4 13 1
20 {	Turnips	Barley	Seeds	Seeds	Wheat	Pease	
	5 10 0	4 14 7½	2 18 9½	1 11 11½	5 13 2½	4 15 9½	4 4 0½
20 {	Turnips	Barley	Seeds	Seeds	Wheat		
	5 10 0	4 14 7½	2 18 9½	1 11 11½	5 13 2½	—	4 1 8½
15 {	Turnips	Barley	Seeds	Seeds	Oats		
	5 3 7½	4 8 2	2 1 5	1 5 6	4 6 11½	—	3 9 1½
15 {	Turnips	Barley	Oats	Fallow	Rye	Pease	
	5 3 7½	4 8 2	4 5 5½	4 2 1½	4 14 2½	4 9 4½	4 10 6
15 {	Turnips	Barley	Oats	R. Clover	Wheat	Pease	
	5 3 7½	4 8 2	4 5 5½	2 5 4	5 6 10	4 9 4½	4 6 5½

A Comparative View of the various Heads of Expenses on the Three principal Modes of Cropping.

Succession of Crops,	Fallow, ½ tares.	Barley.	R.Clover.	Wheat.	Beans.	Average.	150 Acres.	Num- ber of culti- vated Horses and Men.	21.43 32.03
Rent, tithe, rates, and taxes,	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.		
Wear and tear of implements,	1 5 3	1 5 3	1 5 3	1 5 3	1 5 3	1 5 3	189 16 10	7.00	
Ditto of hurdles,	0 4 6	0 2 3	0 0 8	0 2 4	0 2 3	0 2 3	18 2 6		
Expense of horses,	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	2 10 0		
Ditto of labour,	2 7 6	1 13 10	0 5 5	1 1 1	1 0 1	1 2 10	171 8 1		
Depredations and losses,	0 15 4	0 11 6	0 11 6	0 10 1	1 14 0	1 7 13	303 8 9	6.78	
Expense of seed,	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	3 15 0		
Total expense per acre,	4 19 6	4 19 7	2 11 9	5 12 3	5 2 8	4 13 2	298 18 1		
Succession of Crops,	Turnips.	Barley.	Seeds.	Wheat.	Pease.	Average.			
Rent, tithe, rates, and taxes,	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.		
Wear and tear of implements,	1 5 3	1 5 3	1 5 3	1 5 3	1 5 3	1 5 3	189 16 10		
Ditto of hurdles,	0 3 0	0 2 0	0 0 8	0 2 1	0 2 0	0 2 0	15 6 3		
Expense of horses,	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	2 10 0		
Ditto of labour,	2 5 11	0 16 10	0 5 5	1 9 1	0 17 10	0 17 5	130 18 9	5.34	28.05
Depredations and losses,	1 10 11	1 12 4	0 11 6	0 3 9	2 0 10	1 4 11	187 6 10	6.25	24.00
Expense of seed,	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	3 15 0		
Total expense per acre,	0 2 0	0 17 2	0 15 0	—	1 6 3	0 2 0	100 15 7		
Succession of Crops,	Fallow.	Wheat.	Oats.	Barley.	Beans.	Average.			
Rent, tithe, rates, and taxes,	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.		
Wear and tear of implements,	0 19 1	0 19 1	0 19 1	0 19 1	0 19 1	0 19 1	143 8 9		
Ditto of hurdles,	0 4 2	0 2 0	0 2 0	0 2 0	0 2 0	0 2 0	91 11 3		
Expense of horses,	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	0 0 4	2 10 0		
Ditto of labour,	2 4 2	0 17 2	0 19 11	2 4 2	0 19 11	1 7 7	207 0 7	8.45	17.74
Depredations and losses,	0 14 7	2 2 4	1 13 3	0 14 7	1 13 9	1 8 9	315 15 7	7.19	20.83
Expense of seed,	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	0 0 6	3 15 0		
Total expense per acre,	4 3 0	5 3 6	4 7 5	4 3 0	4 13 1	4 11 1	283 2 6		

Horses, per annum, 24*l*. 9*s*. 8*d*.—Men, per annum, 29*l*. 19*s*. 6*d*.

Compara.

Comparative tables, in which the various small items of expense are collected under their proper heads, are calculated not only to explain, but also to afford demonstration of the particular consequences which result from every mode of husbandry which is, or can be adopted. If any error is suspected, it may be easily traced to its source, and the investigation will generally prove whether the error resides in the calculation, or in the mind of the reader. Common opinions are frequently inconsistent, and the power of figures is sufficient, in many cases, to reconcile them, where, from the minute and complicated nature of the subject, arguments would be of no avail. In the calculation on the food and labour of horses, there are three points to be attended to, viz. the annual expense, the number of days in which a horse is employed, and the proper charge for each day's work. Now it is obvious, if any two of these articles be known, the third naturally depends upon, and is deduced from them, and consequently calculations, conducted in this way, must be necessarily consistent with each other, and by presenting the subject in various points of view, tend to point out the road to truth, and to remove some of the obstacles which can never be removed by any other means.

The expense of horses has been estimated in this county, at from 35*l.* to 50*l.* per annum, and some of the farmers have mentioned as little as 20*l.* for the annual expense of this animal; but what conclusion can be deduced from such distant extremes?

When the data on which a calculation is founded, are exhibited to the view of the reader, he may form his own judgment of the propriety or impropriety of every article; but when this is neglected, the calcu-

lations appear, to me at least, to answer no purpose whatever. They leave no impression on the mind of the reader, who has no previous knowledge of the subject, or they lead to most erroneous conclusions on subjects of much importance.

The annual expense of horses per annum, which is given in the preceding table, shews what is earned on the arable part of the farm; and the remainder of their *actual expense* belongs to the grass land, &c. On sandy soils, it will be perceived that the horses may be employed a part of the winter in marling the land, &c.; but this business could not be included in the general calculations.

If a horse works in winter, he must be supposed to consume more, and better food, and his decline in value, &c. will be increased. In calculations on improving commons, &c. it has been supposed that 30 or 40 acres may be added to a good farm, without increasing the number of horses; but I conceive such opinions are founded on partial views of the subject. If the horses had not sufficient employment before the addition was made, the farmer would act unwisely in keeping them; but if the contrary was the case, the consequence will be, that both the old and new farm will be insufficiently tilled; and this is generally the first effect of agricultural monopoly.

The Profits of Arable Land.

In estimating the profits of agriculture, some writers have proceeded on the supposition that the average produce of wheat is four loads per acre; while others have calculated on no less than four quarters, from land of which the rent does not exceed 20s. per acre.

Now, if by the former supposition it should appear
that

that the farmer's gain on the wheat crop amounts to 40*s.* per acre, the latter would raise it to at least 7*l.* under the same circumstances; which, instead of being accurate, in point of fact, is in all probability more than is gained from an acre of ordinary land in ten years by the farmers of Bedfordshire. Calculations conducted on such principles, have been represented as extremely delusive or unsatisfactory. I shall therefore attempt nothing of that kind, but form the estimates of produce on what are considered as the just gains of the cultivator, by which means every one may form his own judgment on the merit of various rotations, as also, whether the actual produce exceeds or falls short of what a farmer has a right to expect.

The Ministers who proposed the property tax, and the Legislature that passed it into a law, appear to have considered the income of the occupiers of land, as amounting on the average to nearly three-fourths of the rent which is paid to the landlord. In the following pages I shall, therefore, make use of this supposition as the basis of calculation, and apply it to the various courses of cropping before specified. The income or property tax is nominally 1*s.* 6*d.* in the pound; but one-eighth is deducted, which reduces it to 1*s.* 3½*d.* This proceeds on the supposition of Government, that a farmer gains on the average 13*s.* 1½*d.* from an acre of land which is rented at 20*s.*; but the income tax, during its temporary operation, reduces the farmer's actual profits to 11*s.* 9½*d.* per acre.

But the loss which attends the hedges and roads of a farm of 180 acres, has been stated at 2*l.* 9*s.* 2½*d.* and the loss of the regular or average profit, as above stated, amounts to 4*l.* 12*s.* 1½*d.* making together the sum of 7*l.* 1*s.* 4*d.* or 9½*d.* per acre on the farm in question.

question. The produce of the arable must therefore be supposed to exceed the expenses as much as 12s. 7d. per acre, to leave a clear average profit of 11s. 9½d. But if such are supposed to be the average profits of cultivation, it is well known that the extremes are far asunder. Neglect, ignorance, or misfortune, are singly sufficient to reduce the farmer's profits to nothing, while a skilful and spirited cultivation will perhaps enable the farmer to gain as much as the landlord. The gains of those who farm under the disadvantageous circumstances of common-fields, &c. may be stated at 2s. below the average; but those who adopt the best courses of crops, in parishes which are enclosed and tithe-free, ought to be supposed to gain at least 2s. above the general average of cultivators.

I conceive that the farmer who adopts the five-shift course, and sows annually one-third of the clay fallows with tares, without permitting the land to become foul, will be supposed a good manager in this county, and ought therefore to gain 13s. 9½d. per acre, or with the hedges and roads 14s. 7d.

The gain from an acre of land which is rented at 15s. tithe-free, is, according to the income act, 9s. 10d. and the income tax reduces it to 8s. 10d.; but when the amount of the necessary capital is considered, it will be obvious that so small a profit would be unworthy of attention, and agriculture, under such circumstances, a ruinous employment.

Previous to the consideration of the produce of corn, it seems necessary to form an estimate of the inferior articles of agricultural profit, which are too minute to be varied according to particular circumstances.

Stubbles.—The scattered corn which is left by the gleaners,

gleaners, and the couch, and other grasses, which infest arable land, may be presumed to support a folding flock after the rate of three per acre for one week after harvest; and it will be a subject of regret rather than otherwise, if this kind of food is worth more than 1s. per acre.

The feed of young clover in the barley stubbles, is in many cases worth 5s. per acre, and the value of the barley straw in a wet summer is much increased by the same means; yet these are seldom desirable circumstances. Clover is frequently a pernicious weed, so far as concerns the crop with which it is sown, and probably injures it to the amount of 5s. per acre, on the average. There are farmers also who never feed the clover stubbles in the autumn; and on the whole, it seems proper to estimate their value at about 3s. per acre.

Straw, Chaff, &c.—The value of the straw, &c. has been supposed in some calculations to be equal to the expense of thrashing and carrying out; but in a district where the straw belongs to the farm, it requires good management to derive a profit from it exceeding 5s. per acre, on the average. Some farmers give the cattle hay in cribs, by which means the whole of the straw is trodden to dung, and the chaff only remains, in that case, an article of profit. Probably 3s. per acre is not far from the actual gains of farmers in general.

Tares.—It is supposed that a good farmer may sow one-third of the clay fallows with tares, and the crop which will be produced in that case, without manure, may probably support a flock of 100 folding sheep for nearly

nearly a week, which at 4*d.* per head, amounts to 33*s.* 4*d.* In the present case, I shall however state the value of the tares at 30*s.* per acre, or 10*s.* on the average of the fallows, for if the tares are not sown on a part of the field which is nearly, free from couch-grass, and the land be well managed after they are removed, the farmer may expect to lose not only 3*s.* 4*d.* in the subsequent crops, but perhaps double the value of the tare crop.

It need scarcely be observed, that this is on the supposition that the farmer will neither drill, dibble, nor hoe any of the corn which succeeds the tares, and which will seldom fail of being verified in this county.

Clover-Hay.—The intrinsic value of hay has been previously estimated at 2*s.* 3*d.* per cwt. and the following table will shew the value of the produce at that price, from 20 to 41 cwt.

The Value of Clover and Meadow Hay.

<i>Cwt.</i>	<i>Value.</i>	<i>Cwt.</i>	<i>Value.</i>
20	£.2 5 0	31	£.3 9 9
21	2 7 3	32	3 12 0
22	2 9 6	33	3 14 3
23	2 11 9	34	3 16 6
24	2 14 0	35	3 18 9
25	2 16 3	36	4 1 0
26	2 18 6	37	4 3 3
27	3 0 9	38	4 5 6
28	3 3 0	39	4 7 9
29	3 5 3	40	4 10 0
30	3 7 6	41	4 12 3

The after-feed of clover is sometimes considerable, but
in

in dry seasons very trivial. It may perhaps keep three sheep per acre from eight to twelve weeks, at $4\frac{1}{2}d.$ per head. Some farmers prefer to plough much of it under the furrow, as a green manure for wheat, and those who seed the second crop, must expect a proportionate diminution of the succeeding crops of corn, though it is very possible it may not be perceived in the wheat.

Produce of Corn.—The average prices of corn, which have been given, relate only to the saleable part of it, and consequently the offal must be estimated according to its relative value, rather than the actual quantity. The following table is intended to facilitate the examination of the merits of any proposed course of crops.

The Average Value of the various Species of Corn, from Fifteen to Fifty Bushels, from 1801 to 1806.

Bush.	Wheat.			Rye.			Barley.			Oats.			Beans or Pease.			Tares.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1	0	8	9 ¹ / ₂	0	5	4 ¹ / ₂	0	4	3 ¹ / ₄	0	3	0	0	5	0 ¹ / ₂	0	6	0
15	6	11	5	4	0	4	3	4	3	2	5	0	3	15	0	4	10	0
16	7	0	2	4	5	8	3	8	6	2	8	0	4	0	6	4	16	0
17	7	8	11	4	11	0	3	12	9	2	11	0	4	5	6	5	2	0
18	7	17	8	4	16	5	3	17	1	2	14	0	4	10	7	5	8	0
19	8	6	5	5	1	9	4	1	4	2	17	0	4	15	7	5	14	0
20	8	15	2	5	7	1	4	5	8	3	0	0	5	0	8	6	0	0
21	9	4	0	5	12	5	4	9	11	3	3	0	5	5	8	6	6	0
22	9	12	9	5	17	10	4	14	2	3	6	0	5	10	8	6	12	0
23	10	1	6	6	3	2	4	18	5	3	9	0	5	15	8	6	18	0
24	10	10	3	6	8	6	5	2	9	3	12	0	6	0	9	7	4	0
25	10	19	0	6	13	10	5	7	1	3	15	0	6	5	10	7	10	0
26	11	7	9	6	19	2	5	11	4	3	18	0	6	10	10	7	16	0
27	11	16	6	7	4	7	5	15	7	4	1	0	6	15	10	8	2	0
28	12	5	3	7	9	11	5	19	10	4	4	0	7	0	10	8	8	0
29	12	14	0	7	14	3	6	4	2	4	7	0	7	5	11	8	14	0
30	13	2	10	8	0	7	6	8	6	4	10	0	7	11	0	9	0	0
31	13	11	7	8	6	0	6	12	9	4	13	0	7	16	0	9	6	0
32	14	0	4	8	11	4	6	17	0	4	16	0	8	1	0	9	12	0
33	14	9	1	8	16	8	7	1	3	4	19	0	8	6	0	9	18	0
34	14	17	10	9	2	0	7	5	6	5	2	0	8	11	1	10	4	0
35	15	6	7	9	7	4	7	9	10	5	5	0	8	16	2	10	10	0
36	15	15	4	9	12	9	7	14	1	5	8	0	9	1	2	10	16	0
37	16	4	1	9	18	1	7	18	4	5	11	0	9	6	2	11	2	0
38	16	12	11	10	3	5	8	2	8	5	14	0	9	11	2	11	8	0
39	17	1	8	10	8	9	8	6	11	5	17	0	9	16	3	11	14	0
40	17	10	5	10	14	2	8	11	3	6	0	0	10	1	3	12	0	0
41	17	19	2	10	19	6	8	15	6	6	3	0	10	6	4	12	6	0
42	18	7	11	11	4	10	8	19	9	6	6	0	10	11	4	12	12	0
43	18	16	8	11	10	3	9	4	1	6	9	0	10	16	5	12	18	0
44	19	5	5	11	15	7	9	8	4	6	12	0	11	1	5	13	4	0
45	19	14	2	12	0	11	9	12	8	6	15	0	11	6	6	13	10	0
46	20	3	0	12	6	4	9	16	11	6	18	0	11	11	6	13	16	0
47	20	11	9	12	11	8	10	1	2	7	1	0	11	16	6	14	2	0
48	21	0	6	12	17	0	10	5	6	7	4	0	12	1	6	14	8	0
49	21	9	3	13	2	4	19	9	9	7	7	0	12	6	6	14	14	0
50	21	18	0	13	7	8	10	14	1	7	10	0	12	11	7	15	0	0

Tables

Tables of Produce, adapted to Twelve different Courses of Crops.

Course of Crops,	Fallow, one-third Tares.	Barley.	Red Clover.	Wheat.	Beans.	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Expenses. Average, 4l. 13s. 2½d.	4 19 6½	4 19 7	2 11 9½	5 12 3½	5 2 8½	—
Value of stubbles, &c.	—	0 3 0	—	0 1 0	0 1 0	—
Ditto straw and chaff,	—	0 3 0	—	0 3 0	0 3 0	—
Produce, in bushels, cwt. &c.	—	35 bush.	28 cwt.	21 bush.	21 bush.	—
Sheep-feed (single weeks),	—	—	33, at 4½d.	—	—	—
Value of corn, hay, &c.	—	7 9 10	3 3 0	9 4 0	5 5 8	—
Total produce,	0 10 0	7 15 10	3 15 4½	9 8 0	5 9 8	—
Average gain,	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7	—
Course of Crops,	Fallow, one-third Tares.	Barley.	Red Clover.	Wheat.		
	£. s. d.	£. s. d.	£. s. d.	£. s. d.		
Expenses. Average, 4l. 10s. 9½d.	4 19 6½	4 19 7	2 11 9½	5 12 3½	—	—
Value of stubbles, &c.	—	0 3 0	—	0 1 0	—	—
Ditto straw and chaff,	—	0 3 0	—	0 3 0	—	—
Produce, in bushels, cwt. &c.	—	35 bush.	25 cwt.	21 bush.	—	—
Sheep-feed (single weeks),	—	—	31 weeks.	—	—	—
Value of corn, hay, &c.	—	7 9 10	2 16 3	9 4 0	—	—
Total produce,	0 10 0	7 15 10	3 7 9	9 8 0	—	—
Average gain,	0 14 7	0 14 7	0 14 7	0 14 7	—	—

Course of Crops,	Fallow, one-third Tares.	Barley.	Beans.	Wheat.	£. s. d.	£. s. d.
Expenses. Average, 5l. 7½d. ..	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Value of stubbles, &c.	4 13 1½	4 13 1½	4 16 3¼	6 0 0	—	—
Ditto straw and chaff,	—	0 1 0	0 1 0	0 1 0	—	—
Produce, in bushels, cwt. &c.	—	0 3 0	0 3 0	0 3 0	—	—
Sheep-feed (single weeks),	—	32 bush.	23 bush.	20 bush.	—	—
Value of corn, hay, &c.	—	—	—	—	—	—
Total produce,	0 10 0	6 17 0	5 15 8	8 15 2	—	—
Average gain,	0 11 10	7 1 0	5 19 8	8 19 2	—	—
		0 11 10	0 11 10	0 11 10	—	—
Course of Crops,	Fallow.	Wheat.	Seeds.	Seeds.	Oats.	£. s. d.
Expenses. Average, 3l. 9s.	4 7 1½	5 4 1½	1 19 11½	1 5 6	4 8 4½	—
Value of stubbles, &c.	—	0 3 0	—	—	0 1 0	—
Ditto straw and chaff,	—	0 3 0	—	—	0 3 0	—
Produce, in bushels, cwt. &c.	—	20 bush.	—	—	44 bush.	—
Sheep-feed (single weeks),	—	—	160 weeks.	80 weeks.	—	—
Value of corn, hay, &c.	—	8 15 2	—	—	6 12 0	—
Total produce,	—	9 1 2	3 0 0	7 10 0	6 16 0	—
Average gain,	0 12 5½	0 12 5½	0 12 5½	0 12 5½	0 12 5½	—

Course of Crops,	Fallow.		Wheat.		Oats.		Fallow.		Barley.		Beans.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, 4l. 11s. 1d.	4	3 0½	5 3 6½	4 7 5½	4 7 5½	4 3 0½	4	3 0½	4 13 1½	4 16 3¼	4 16 3¼	
Value of stubbles,	—	—	0 1 0	0 1 0	0 1 0	—	—	—	0 1 0	0 1 0	0 1 0	
Ditto straw and chaff,	—	—	0 3 0	0 3 0	0 3 0	—	—	—	0 3 0	0 3 0	0 3 0	
Produce, in bushels, cwt. &c.	—	—	22 bush.	40 bush.	40 bush.	—	—	—	37 bush.	25 bush.	25 bush.	
Sheep-feed (single weeks),	—	—	—	—	—	—	—	—	—	—	—	
Value of corn, hay, &c.	—	—	9 12 9	6 0 0	6 0 0	—	—	—	7 18 4	6 5 10	6 5 10	
Total produce,	—	—	9 16 9	6 4 0	6 4 0	—	—	—	8 2 4	6 9 10	6 9 10	
Average gain,	0 11 6		0 11 6	0 11 6	0 11 6		0 11 6		0 11 6	0 11 6	0 11 6	
Course of Crops,	Fallow, one-third Tares.		Wheat.		Fallow, one-third Tares.		Barley.					
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, 4l. 15s. 8½d.	4 13 1½		5 3 6½	4 13 1½	4 13 1½	4 13 1½	4 13 1½		—	—	—	
Value of stubbles, &c.	—	—	0 1 0	—	—	—	0 1 0		—	—	—	
Ditto straw and chaff,	—	—	0 3 0	—	—	—	0 3 0		—	—	—	
Produce, in bushels, cwt. &c.	—	—	25 bush.	—	—	—	42 bush.		—	—	—	
Sheep-feed (single weeks),	—	—	—	—	—	—	—		—	—	—	
Value of corn, hay, &c.	—	—	10 19 0	—	—	—	8 19 9		—	—	—	
Total produce,	0 10 0		11 3 0	0 10 0	0 10 0	0 10 0	9 3 9		—	—	—	
Average gain,	0 10 1½		0 10 11½	0 10 11½	0 10 11½	0 10 11½	0 10 11½		—	—	—	

Course of Crops,	Fallow, one-third Tares.		Wheat.		Fallow, one-third Tares.		Barley.		Fallow, one-third Tares.		Pease.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, 5 <i>l.</i> 2 <i>s.</i> 2 <i>d.</i>	4	19 6½	5	10 0	4	19 6½	4	19 7	4	19 6½	4	15 9½
Value of stubbles, &c.	—	—	0	1 0	—	—	0	1 0	—	—	0	1 0
Ditto straw and chaff,	—	—	0	3 0	—	—	0	3 0	—	—	0	3 0
Produce, in bushels, cwt. &c.	—	—	27 bush.	—	—	—	7 bush.	—	—	—	20 bush.	—
Sheep-feed (single weeks),	—	—	—	—	—	—	—	—	—	—	—	—
Value of corn, hay, &c.	—	—	11	16 6	—	—	10	1 2	—	—	5	0 8
Total produce,	0	10 0	12	0 6	0	10 0	10	5 2	0	10 0	8	6 5
Average gain,	0	14 3	0	14 3	0	14 3	0	14 3	0	14 3	8	10 5
Course of Crops,												
Course of Crops,	Turnips.		Barley.		Red Clover.		Wheat.		Pease.		Fallow, one-third Tares.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, 4 <i>l.</i> 13 <i>s.</i> 1 <i>d.</i>	5	10 0	4	14 7½	2	11 9½	5	19 2½	4	15 9½	4	19 6½
Value of stubbles,	—	—	0	3 0	—	—	0	1 0	—	—	—	—
Ditto straw and chaff,	—	—	0	3 0	—	—	0	3 0	—	—	—	—
Produce, in bushels, cwt. &c.	—	—	30 bush.	—	25 cwt.	—	19 bush.	—	—	—	—	—
Sheep-feed (single weeks),	131, at 5½ <i>d.</i>	—	—	—	33, at 4½ <i>d.</i>	—	—	—	—	—	—	—
Value of crop, hay, &c.	3	0 0	6	8 6	2	16 3	8	6 5	—	—	—	—
Total produce,	3	0 0	6	14 6	3	8 9	8	10 5	—	—	—	—
Average gain,	0	14 7	0	14 7	0	14 7	0	14 7	—	—	—	—

Course of Crops,	Turnips.	Barley.	Seeds.	Seeds.	Seeds.	Wheat.	Pease.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Expenses. Average, 4l. 4s. 0½d.	5 10 0	4 14 7½	2 18 9½	2 18 9½	1 11 11½	5 13 2½	4 15 9½
Value of stubbles,	—	0 3 0	—	—	—	0 1 0	0 1 0
Ditto straw and chaff,	—	0 3 0	—	—	—	0 3 0	0 3 0
Produce, in bushels, cwt. &c.	—	32 bush.	25 cwt.	25 cwt.	—	19 bush.	20 bush.
Sheep-feed (single weeks),	131 weeks.	—	33 weeks.	33 weeks.	120 weeks.	—	—
Value of corn, hay, &c.	—	6 17 0	2 16 3	2 16 3	—	8 6 5	5 0 8
Total produce, ...	3 0 0	7 3 0	3 8 9	3 8 9	2 5 0½	8 10 5	5 4 8
Average gain,	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7
Course of Crops,	Turnips.	Barley.	Seeds.	Seeds.	Seeds.	Wheat.	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	
Expenses. Average, 4l. 1s. 8½d.	5 10 0	4 14 7½	2 18 9½	2 18 9½	1 11 11½	5 13 2½	
Value of stubbles,	—	0 3 0	—	—	—	0 1 0	
Ditto straw and chaff,	—	0 3 0	—	—	—	0 3 0	
Produce, in bushels, cwt. &c.	—	32 bush.	24 cwt.	24 cwt.	—	19 bush.	
Sheep-feed (single weeks),	123, at 5½d.	—	33, at 4½d.	33, at 4½d.	120	—	
Value of corn, hay, &c.	—	6 17 0	2 14 0	2 14 0	—	8 6 5	
Total produce,	2 16 6	7 3 0	3 6 6	3 6 6	2 5 0½	8 10 5	
Average gain,	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7	0 14 7	

Course of Crops,	Turnips.		Barley.		Seeds.		Seeds.		Oats.		Pease.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, <i>3l. 9. 1½d.</i>	5	3 7½	4	8 2	2	1 5	1	5 6	4	6 11½	—	—
Value of stubbles,	—	—	0	3 0	—	—	—	—	0	1 0	—	—
Ditto straw and chaff,	—	—	0	3 0	—	—	—	—	0	3 0	—	—
Produce, in bushels, cwt. &c.	120	—	32 bush.	—	160	—	82	—	36 bush.	—	—	—
Sheep-feed (single weeks),	—	—	5	17 0	—	—	—	—	5	8 0	—	—
Value of corn, hay, &c.	2	15 0	7	3 0	3	0 0	1	10 7½	5	12 0	—	—
Total produce,	0	11 0	0	11 0	0	11 0	0	11 0	0	11 0	—	—
Average gain,												
Course of Crops,	Turnips.		Barley.		Oats.		Fallow.		Rye.		Pease.	
	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
Expenses. Average, <i>4l. 10s. 6d.</i>	5	3 7½	4	8 2	4	5 5½	4	2 1½	4	14 2½	4	9 4½
Value of stubbles,	—	—	0	1 0	0	1 0	—	—	0	1 0	0	1 0
Ditto straw and chaff,	—	—	0	3 0	0	3 0	—	—	0	3 0	0	3 0
Produce, in bushels, cwt. &c.	181	—	32 bush.	—	36 bush.	—	—	—	35 bush.	—	20 bush.	—
Sheep-feed (single weeks),	—	—	6	17 0	5	8 0	—	—	9	7 4	5	0 8
Value of corn, hay, &c.	3	0 0	7	1 0	5	12 0	—	—	9	11 4	5	4 8
Total produce,	0	11 0	0	11 0	0	11 0	0	11 0	0	11 0	0	11 0
Average gain,												

Course of Crops,	Turnips.	Barley.	Oats.	Red Clover.	Wheat.	Pease.
Expenses. Average, 4l. 6s. 5½d.	£. s. d. 5 3 7½	£. s. d. 4 8 2	£. s. d. 4 5 5½	£. s. d. 2 5 4	£. s. d. 5 6 10	£. s. d. 4 9 4½
Value of stubbles,	—	0 1 0	0 3 0	—	0 1 0	0 1 0
Ditto straw and chaff,	—	0 3 0	0 3 0	—	0 3 0	0 3 0
Produce, in bushels, cwt. &c.	—	27 bush.	32 bush.	22 cwt.	17 bush.	18 bush.
Sheep-feed (single weeks),	120	—	—	29	—	—
Value of corn, hay, &c.	—	5 15 7	4 16 0	2 9 6	7 8 11	4 10 7
Total produce,	2 15 0	5 19 7	5 2 0	3 0 8	7 12 0	4 14 7
Average gain,	0 11 0	0 11 0	0 11 0	0 11 0	0 11 0	0 11 0

Observations on the Estimates of Produce.

The first course in the preceding tables, has served as a basis on which the calculations are all founded. There is reason to believe that no course is more productive on clay loams, which are worth 20s. per acre, tithe free; and from the best observations which I have been able to make, the produce is such as may be expected, on the average, under the usual broad-cast husbandry.

In calculations of the profits of husbandry, it has been common to consider the fallow season as a preparation for the succeeding crop, but it appears to me as the first step, as it were, of every course of cropping, the effect of which is gradually disappearing, as the soil becomes exhausted, and the weeds accumulate.

On a superficial view of the subject, the crop of wheat is invariably the most profitable one in every rotation: but were it possible to discover the best mode of management in every case, it is obvious that in a strict sense every crop would be productive of equal gain to the cultivator. The numbers of the courses refer to the table of courses which contains the expenses only.

The second course differs from the first only in a neglect of the use of beans. The produce of wheat and barley is estimated at the same quantity in both cases; but it appears that a diminution of more than 3cwt. of clover in the latter, leaves the farmer his regular profit; and it is presumed that the frequent returns of the clover crop in this case, will sufficiently account for the stated deficiency.

In the first course the beans appear to yield a profit
of

of no more than 6*s.* 11½*d.*; but it should be considered, that an indirect profit attaches to them, in their delaying the frequent returns of the other crops, but particularly the red clover. Opinions differ with respect to the relative merit of the first and second rotations.

The third course, or three crops and fallow, has many advocates on the poor cold clays in the north of Bedfordshire, where it is said that wheat succeeds ill after clover, and the clover itself frequently misses plant. The crops which are given may probably be near the average on a poor soil where the use of the hoe is scarcely known.

The fourth course is sometimes practised on the north of the Ouse, under the idea that poor, thin-stapled clays should never bear two successive corn crops of any kind.

Oats are sown after the ray-grass, and other seeds, as wheat is seldom successful in such cases. It may however be observed, that 44 bushels of oats are worth but little more than fifteen bushels of wheat.

The fifth is the common course of the unenclosed parishes, by which it appears that crops rather large, produce but a very moderate profit to the farmer. This course is adhered to by some farmers in the enclosed parts of the county; in which case they possess the power of deriving some profit from a part of the fallows, by sowing tares or clover for the flock. The expenses attending open-field farming, are larger in many respects than appear in the tables.

The sixth and seventh courses are similar, but applied to land of different quality. It does not appear that this course is adopted in any part of this county, except by one or two farmers in the parish of Stotfold, whose arable land is situate in only two fields. Where

the fallows return so often, it is obvious that not only one-third of them may be sown with tares, clover, &c. but that the whole ought to produce spring-feed of some kind, to enable the farmer to gain a fair profit under so inauspicious a system. The crop and fallow course is almost universally adopted in the district of the Roodings in Essex, yet the *necessary* crops, even on a poor soil, appear so large, that it is rather surprising how the farmers contrive to gain a subsistence. The expense attending the manure is probably less than what appears in the tables, as the annual quantity cannot be very considerable.

The eighth course is common on the gravelly loams, but oats are frequently substituted for pease, as the latter are very liable to prove a deficient crop.

Pease are considered as an ameliorating crop; yet in the tables may be seen abundant proof, that a small crop of either pease or beans afford little or no profit to the cultivator. On a good soil of 20s. rent, nineteen bushels of pease or beans are merely sufficient to pay the ordinary expenses, and there appears little reason to believe that the average of broad-cast pease exceeds four loads per acre.

In the present season (1807) many a promising crop has been utterly destroyed by the green aphid.

The ninth is the common course of the sandy district, and the produce is apparently such as may be expected on good soils; but on poor hilly sands, the average produce of barley will be much below four quarters per acre.

Poor soils are supposed to be most profitably applied to the growth of rye rather than wheat, and it may be observed, that 25 bushels of the former are equal in value to fifteen of the latter.

The

The tenth course is similar to the ninth, except in the omission of the crop of pease. In this course it appears, that if the crops of barley and wheat be supposed to equal those assigned to the preceding course, the farmer can afford to lose 3*s.* 6*d.* in the turnip crop, and 2*s.* 3*d.* in the seeds.

The direct profit on the pea crop appears to be only 8*s.* 10½*d.* even on the supposition that the benefit of the fallow does not extend to the sixth year; but if, as here supposed, the turnips and clover will be more valuable when they occur but once in six years instead of five, the gain from the pease will be equal, in this point of view, to 14*s.* 7½*d.* per acre. If the pease be drilled, and well hoed, the weeds will be diminished, and the crop increased; but under the broad-cast husbandry, the weeds, particularly the twitch, or *holcus mollis*, increase so rapidly in the sixth year, as to render it doubtful whether the pea crop is not injurious to the farmer and the public. The profit assigned to the second year's seeds is 13*s.* 1*d.* in a direct view of the subject; this is therefore a losing crop, as though it allows time for the couch to increase, it pays nothing toward its extirpation; the real utility of permitting mixed seeds to remain two years, consists therefore in the time which is allowed for the earth to absorb the atmospheric manures, while it produces only a crop which is consumed on the place where it grows. Ray-grass, which some suppose to be an exhausting vegetable, is used in Bedfordshire for resting and improving the soil.

The eleventh course, in which oats are sown instead of wheat, and the seeds of both seasons are fed with sheep, &c. is said to be the most proper for poor soils.

The advocates for this course, who are principally the

the bailiffs of the nobility, and natives of Northumberland, assert, that a good crop of oats is more valuable, and exhausts the ground less, than a bad one of wheat. It may be a subject of dispute, whether, in the table of produce, the barley is not estimated too high, and consequently the oats too low; fourteen bushels of wheat are however more valuable, on the average, than five quarters of oats.

This course is believed to be very proper for improving an exhausted soil, but neither this nor any other mode of improvement, seems calculated to afford immediate profit, nor would be adopted, except by those who have leases, or a well-grounded confidence in the liberality of their landlord.

The twelfth and thirteenth courses are such as have been common in the open fields of the sandy district, and the disadvantage of an unproductive summer fallow, is in the twelfth course very conspicuous. The large produce of rye which is given in the table, produces little profit to the farmer, and yet perhaps every article of this course is estimated too high to be often realized.

The produce of the thirteenth course is probably nearer the average of the sandy district, where the farmers are subject to the several disadvantages and extra expenses of open fields, which could not be inserted in the tables.

It may be regarded as some proof of the accuracy of the preceding tables of expenses, &c. that the crops which are necessary to allow the farmer a fair profit, appear to coincide nearly with the public opinion of the average produce of the county, which has been stated by some considerable farmers nearly as follows: wheat and beans on different soils from three to five loads

loads in general; barley from three to five quarters; oats from four to six quarters.

It would be difficult to say, whether certain motives of jealousy, &c. might not induce some farmers to estimate the produce below the truth; but the farmers' estimates are generally formed on their *hopes*, rather than their *fears*, and their own private sentiments are more likely to exceed than fall short of the average.

People are willing to forget as soon as possible, the destructive effects of blights, mildews, hail-storms, vermin, wet harvests, smut, &c. by which the extra gains of four or five years of prosperity are sometimes suddenly wrested from their grasp.

The operations of draining, marling, dibbling, hoeing, &c. add considerably to the farmer's ordinary expenses, and doubtless to his profits, when properly conducted. But for a regular investigation of these collateral parts of husbandry, more materials are necessary than can be easily obtained. The culture of potatoes, carrots, parsnips, and cabbages, deserve a separate investigation, but experiments to ascertain their value per bushel, &c. for feeding cattle of various descriptions, ought to be previously made. Potatoes are said, and indeed known to be an exhausting crop, yet if they were consumed on the soil where they grow, in the same manner as turnips, the soil could not fail of being improved by the manure made in consuming them.

Of the Capital employed in Agriculture.

The most proper time to appreciate the value of a farmer's capital, is apparently at the period when the farm is delivered to a successor, as the implements, &c. will then produce no more than their average value,
and

and as there does not appear any substantial reason why a farmer's stock should be worth more at one time than at another.

Horses.—The value of farm-horses may be taken on the average at 23*l.* each, which is the medium between 10*l.* and 36*l.* The tillage of 150 acres will require, as before stated, seven horses, one of which will be occasionally employed as a market-nag, to transact the necessary business of the farm. The value of half a horse may be deducted on account of the business which does not strictly belong to the 150 acres of arable.

Gears.—The prime cost of a complete set of gears for ploughing, carting, &c. will amount to nearly 4*l.* per horse; but the average value of such as are used by the farmer of 150 acres, is about 2*l.* 2*s.* or something more than half the original price.

Sheep.—The common price of the improved breeds of sheep at Michaelmas, may be about 35*s.* per head for wethers and ewes, and 25*s.* for lambs; but a general average of the sheep stock in the county, exclusive both of the high priced tups, and the half starved folding sheep of the open fields, may be presumed not to exceed 27*s.* each.

On the farm of 150 acres, I shall suppose 75 sheep are kept on the produce of the arable, at 30*s.* each.

If more sheep are allowed to a farm of this extent, which is little adapted to produce winter keep, they will be, in fact, the stock of the pasture, or of some other farm which supports them in winter on turnips, &c.

Pigs.

Pigs.—The breeding sows, &c. which are supported on corn or other produce of the arable part of the farm, will perhaps be worth 5*l*.

Poultry.—These may be estimated at about 3*l*. varying much according to the opinion of the occupier. Those who dislike the trouble of them, generally contrive to persuade themselves that they are unprofitable articles.

Implements.—The occupier of 150 acres will not be supposed to use any implements which are in the last stages of decay, consequently, they must be estimated at something more than half the original cost on the average. The expense of the implements and the live stock, will be nearly as follows :

Horses, six and a half, at 23 <i>l</i> . each,	£. 149	10	0
Sheep, 75, at 30 <i>s</i> . each,	112	10	0
Pigs,	5	0	0
Poultry,	3	0	0
Implements, &c. horses' gears,	13	13	0
A waggon,	18	0	0
Three carts, at 9 <i>l</i> . (one allowed for the } pasture),	27	0	0
A roller,	2	10	0
Three pairs of common harrows,	6	0	0
Heavy harrows,	3	10	0
Three ploughs, at 30 <i>s</i> . each,	4	10	0
Wheelbarrow, &c.	1	0	0
Three cribs,	2	0	0
Sheep racks, &c.	2	0	0

Carry forward, £. 350

3 0
Brought

Brought forward,	£.350	3	0
Hog troughs, &c.	1	0	0
Hurdles, 100, at 10s. per dozen,	4	4	0
Ladders, &c.	2	0	0
Forks, spades, rakes, drags, hatchets, &c.	4	0	0
Sacks, 50, at 3s. 6d.	8	15	0
Barn tackle,	5	0	0
Barrels and tubs for brewing, &c.	10	0	0
Sundries,	5	0	0
	£.390	2	0

The remainder of a farmer's capital consists in the clear value of the crop, and the value of the tillage which has been given to the fallows, the amount of which may be seen in the tables of expenses.

Fallows.—This operation may be regarded either as a necessary preparation for the succeeding course of crops, or as a reparation of the injury which the land has sustained, by the crops which have been grown upon it since the preceding fallow. But in this, as in many other cases, where there are reasons on both sides, a kind of an average or medium will generally afford most satisfaction. The preceding tenant may be therefore supposed to pay the rent, tithes, poor's-rates, and other taxes, and perform the highway duty for the thirty acres of fallow, and the incoming tenant should pay the whole expense of the tillage and manuring, without any exception on account of the tares, provided the soil is made clean subsequent to their being fed or carried away in a green state. This expense, according to the first table, amounts to 3*l.* 2*s.* 7½*d.* per acre.

Corn, Hay, Straw, and Chaff.—It is necessary
that

that all the expenses of a crop should be paid to the end of harvest, before any return can be derived from it, and the farmer ought to be supposed to possess a sufficiency to pay the poor's-rates, and other taxes, up to the termination of his occupation, which is supposed to be at Michaelmas. In this case the deductions to be made from the crop, will consist in half a year's rent, and tithes included, carriage to the barns from the stack-yard, thrashing, and expense of sale, and carriage to market. The incoming tenant will probably sow the clover-seed with the barley; but this expense is incurred by the occupier in the ordinary course of husbandry.

A Table, shewing the clear Value of a Crop after Harvest.

Crops.	Fallow, $\frac{1}{2}$ Tares.	Barley.	R. Clover.	Wheat.	Beans.
Produce in bush. } and cwt. }	—	35 lb.	28 cwt.	21 bush.	21 bush.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Value of corn and } hay, }	—	7 9 10	3 3 0	9 4 0	5 5 8
Value of straw } and chaff, .. }	—	0 3 0	—	0 3 0	0 3 0
Value of tillage } of fallow, .. }	3 2 7½	—	—	—	—
Value of clover- } seed, }	—	—	0 8 0	—	—
Total produce, ..	3 2 7½	7 12 10	3 11 0	9 7 0	5 8 8
Expenses.					
Carriage to barns, ..	—	0 2 1	—	0 1 9	0 2 1
Thrashing, &c. ..	—	0 12 6½	—	0 12 3½	0 7 6
Expenses of sale, ..	—	0 1 10½	0 1 10½	0 1 10½	0 1 10½
Carriage to mar- } ket, &c. }	—	0 4 4½	—	0 4 4½	0 4 4½
Half a year's rent, } &c. }	0 10 0	0 10 0	0 10 0	0 10 0	0 10 0
Total expense, ..	0 10 0	1 10 10½	0 11 10½	1 10 4	1 5 10½
Balance per acre.	2 12 7½	6 1 11½	2 19 1½	7 16 8	4 2 9½

152 EXPENSE AND PROFIT OF ARABLE LAND.

Average value of the crops per acre, 4 <i>l.</i> 14 <i>s.</i> 7½ <i>d.</i>		
Total value of the crops, &c. on 150 acres,	}	£.709 13 9
Half a year's rent on six acres and a half of hedges and roads, is 3 <i>l.</i> 5 <i>s.</i> ; but the remaining fuel is probably worth as much, and therefore both are omitted.		
Live stock, implements, &c.		390 2 0
Capital on 150 acres arable, and six acres and a half hedges and roads, }	}	£.1099 15 9

Thus it appears, that the necessary capital on good arable land is 7*l.* per acre.

It seems to have become a kind of established custom among agricultural calculators, to include the interest of the capital among the expenses of farming; but the subject appears to me in an opposite point of view. If a farmer possesses no more than 1000*l.* on his entering into a farm, it is not easy to conceive the possibility of his expending 1000 guineas in the purchase of stock, or the cultivation of the soil.

It may be argued, that the legal interest of 1000*l.* will increase it to 1000 guineas in a year; but whatever may be gained by lending of money, it is evident that a farmer's capital is not in that situation.

Money is no more than an engine, which may be applied to many important purposes when put into the hands of talents and industry, but is not suspected to contain any vegetative power, or principle of growth.

If a farmer gains no more than 50*l.* from a capital of 1000*l.* it is evident he employs his time and abilities to
little

little purpose: He might perhaps have gained as much from the public funds; yet it will scarcely be maintained that he has gained nothing, or that his gains are not the produce of the earth. The capital employed in many trades and professions, is said to produce fifteen per cent. for the *skill and attention* of the owner; but it is generally thought that few cultivators of the soil are thus fortunate in the application of their money and abilities. Fourteen shillings per acre, is considered, in the preceding calculations, to be more than the average gains of the farmer from a soil worth 1*l.* per acre, yet this amounts to no more than ten per cent. on the necessary capital; and as five per cent. may be obtained by lending the money at common interest, the remaining five per cent. is the reward of the skill and attention which is bestowed on the business of the farm, without supposing the manager to perform any of the manual labour, which makes a part of the expenses of cultivation, and must be considered as entirely distinct from the management of the business.

The wages of the bailiffs who manage considerable farms under the improved modes of husbandry, appears to be about 100*l.* per annum in this county; and if the average profit which belongs to the management of a farm should prove, as before stated, about 7*s.* per acre, the expense of the bailiff will be paid by the ordinary gains which arise from the cultivation of 286 acres; and this is as much as a man can attend to, in such a way as is likely to return the greatest profit at the least expense. But the bailiffs of the principal proprietors are generally entrusted with larger farms, as from 300 to 600 acres; and in this case the additional expense of a nag is indispensable.

Some will suppose the expense of a good riding horse .

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will be rather more than 35*l.* per annum; which absorbs the profits of 100 acres more, and leaves the gentleman who occupies a farm by proxy, no more than five per cent. for the use of his capital on a farm of 386 acres.

The Expense and Profit of Grass Land.

On this subject scarcely any thing is known which may serve as a substantial basis of calculation.

The connexion between the rent and the produce, and the number of acres of a particular value which will keep an average sized cow, and the common quantity of butter yielded by a cow in summer and winter, are all subjects of uncertainty; and the most that can be done in this place is, to give a tabular view of the expenses and profits, founded on what can be collected of the general opinion.

I shall suppose the rent to be 35*s.* per acre; which, though in all probability much higher than the average of the county, is not too high for what is called feeding or fattening ground.

The poor's-rates, income, and other taxes, and the highway duty, may be derived from the tables of arable expenses. Weeding, banking, spreading mole-hills, cow-dung, &c. appear to cost about 5*s.* per acre; but the part that is fed with sheep may perhaps cost no more than 3*s.* per acre. Mowing of grass costs 3*s.* and the hay-making probably 3*s.* 6*d.* per acre. The carriage, exclusive of the horses, and pulling and thatching the ricks, will amount to about 5*s.* per acre.

Filling and spreading of manure for the dairy and hay ground, may be about 1*s.* 6*d.* per acre. The manure here intended is, such a part of the dung of pigs and cows, as may be properly deemed to be the produce of the

the grass land, as it does not appear to be good policy to starve the land which produces the necessities of life, in favour of that which produces the luxuries only.

Market charges, casualties, and losses, may be estimated at 2*s.* per acre. In the preceding calculations, half a horse is considered as belonging to the thirty acres of pasture; but there does not appear to be any data on which a regular calculation can be founded. I conceive that 5*s.* per acre, in general, or 6*s.* on the dairy and mowing grounds, and 4*s.* on those employed for fattening sheep, oxen, &c. will not exceed the expense which is generally incurred by the keeping of horses on account of pasture land.

According to the income act, the occupier of land at 35*s.* rent per acre, is supposed to gain 22*s.* 11½*d.* which the income tax reduces to 1*l.* 7½*d.* per acre. Now, if such gains are actually obtained, the produce of two acres employed in the support of milking cows, ought to be worth 8*l.* 13*s.* 5½*d.* per annum; and as, according to an estimate already given, the winter and summer food of a cow is supposed to be worth 10*l.* 8*s.* it appears that two acres and a third of such land are necessary to support a milking cow for a year. The expenses of attendance, milking, medicines, and hazard of death in a cow, have been already estimated at 1*l.* 11*s.* 10*d.*, and to this must be added about 1*l.* 10*s.* for the work of the dairy-maid, 2*s.* 6*d.* for salt and wear of utensils, and 2*d.* per week (2*s.* 6*d.* for fifteen cows), or 8*s.* 8*d.* each, per annum, for firing, making on the whole a drawback on the value of the butter, of 3*l.* 13*s.* per cow. The whole expense and probable produce of a milking cow, will be nearly as follows:

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Hay, 26 weeks, 2 cwt. per week, at 2s. 3d.	£ 5 17 0
Grass, 26 weeks, at 3s. 6d. per week,	4 11 0
Milking, hazards, &c.	1 11 10
Dairy-maid, &c.	1 12 6
Firing,	0 8 8
Bull,	0 2 6
Attendance of pigs,	0 7 0

Total expense, £. 14 10 6

Produce.—Summer butter, } 132lb.	
6lb. 22 weeks, }	
Winter butter, } 66	
3lb. 22 weeks, }	

Total of butter, 198, at 13½d. £. 11 2 9

A calf every year on the average, 1 4 6

One pig to three cows, 44 weeks, at 3s. } 2 4 0
per week,

Total produce, £. 14 11 3

*A General View of the Expenses and Produce of
Grass Land.*

Application of the Soil.	Fattening Cattle.	Fattening Sheep.	Milking Cows.	Hay.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Rent and tithes,	1 15 0	1 15 0	1 15 0	1 15 0
Poor's-rates,	0 6 1½	0 6 1½	0 6 1½	0 6 1½
Income-tax,	0 2 3¼	0 2 3¼	0 2 3¼	0 2 3¼
Window-tax, &c.	0 0 6	0 0 6	0 0 6	0 0 6
Highway duty,	0 1 10½	0 1 10½	0 1 10½	0 1 10½
Total of common expenses,	2 5 10	2 5 10	2 5 10	2 5 10
Weeding, banking, clean- ing, &c.	0 5 0	0 3 0	0 5 0	0 5 0
Mowing,	—	—	—	0 3 0
Hay-making,	—	—	—	0 3 6
Loading, stacking, thatch- ing, &c.	—	—	—	0 5 0
Filling and spreading dung,	—	—	0 1 6	0 1 6
Markets, casualties, and losses,	0 2 0	0 2 0	0 2 0	0 2 0
Expense of horses,	0 4 0	0 4 0	0 6 0	0 6 0
Total expense,	2 16 10	2 14 10	3 0 4	3 11 10
Gain (according to the In- come Act),	1 0 7½	1 0 7½	1 0 7½	1 0 7½
Value of the produce by the same rule,	3 17 5½	3 15 5½	4 0 11½	4 12 5½
Dairy expenses, maid, &c. } milking, lizzard, &c. .. }	—	—	Per Cow.	Per Acre.
Bull,	—	—	3 13 0	1 11 3½
Attendance of pigs,	—	—	0 2 6	0 1 0½
Fatting cows, at 3s. per week,	26 weeks, 18 0	26 weeks, 18 10	4 2 6	1 15 4½
Hazards, &c. deduct,	0 0 6½	0 0 6½	Total aver- age ex- pense, }	6 2 1
Fatting wethers, at 7d.	—	—	Produce of a cow per acre, }	6 4 10
Pounds of beef and mut- ton, at 7½d. per lb. }	124 lb.	121 lb.	85 lb.	85 lb.
Butter per acre, at 13½d. ..	—	—	14 lb.	14 lb.
Veal, at 9d. per lb.	—	—	66 lb.	66 lb.
Pork, at 8d. per lb.	—	—		
Total,	—	—	165 lb.	165 lb.

According to the preceding table, an acre of summer's grass will keep a fatting beast half a year, yet in point of fact, a part of the produce must be devoted to the support of sheep in winter; if not in the summer along with the beast; but I have not sufficient data to divide the produce in a satisfactory manner. The allowance of five sheep to each cow, at 7*d.* per week, may be considered as a confirmation of the common opinions on that subject.

The supposition that a cow produces 6*lb.* of butter per week, in the summer, and 3*lb.* in winter, for 44 weeks, is founded on what is said to have been the general opinion many years since in this county; but I have much doubt whether it is realized on the average. The profit of pigs feeding on the skimmed-milk, is more in the table than has been allowed by some agricultural writers; but little or nothing is known on the subject.

Skimmed-milk is valued at 2*d.* per gallon, and often refused to the poor at that rate; though I conceive in the feeding of pigs it is not rated at five farthings per gallon, and is probably worth but little more.

There are some reasons to believe that the gains of the graziers and dairymen, are less than appears in the table; but be that as it may, it is obvious that the *management* of arable land requires much more attention than that of pasture, and therefore deserves a more ample reward, though the capital employed on the latter is generally the most considerable.

A Comparative View of the Value of the Produce, and Amount of the Labour, on Arable and Grass Land.

	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
Produce of arable, at 20s. } per acre,	5	7	9½	5	7	9½	5	7	9½	5	7	9½
Expense of horses,	2	2	10½	1	2	10½	1	2	10½	1	2	10½
Produce for the use of man,	4	4	11	4	4	11	4	4	11	4	4	11
	Fattening Cattle.			Fattening Sheep.			Milking Cows.			Hay.		
Produce of pasture, at 35s.	3	17	5½	3	15	5½	4	0	11½	4	12	5½
Additional value of pro- duce by dairy manufac- ture, &c.	—			—			Average,			4		
										1		
Total value of produce,	3	17	5½	3	15	5½	6	2	1	6	2	1
Charge for horses,	0	4	0	0	4	0	0	6	0	0	6	0
Produce for the use of man,	3	13	5½	3	11	5½	5	16	1	5	16	1
Comparison of the value } of the produce,	0	11	5½	0	13	5½	1	11	2	1	11	2
	less.			less.			more.			more.		

Thus it appears, that for the purposes of fattening cattle or sheep, land of 35s. per acre affords less for the support of human nature than arable of no more than 20s. per acre. If the sward is worth but 20s. per acre, its produce in beef will be worth 2*l.* 8*s.* or 1*l.* 16*s.* 11*d.* less than arable of the same value. Hence appears an obvious reason why the laying land to pasture diminishes the subsistence, while it increases and cheapens the luxuries of mankind.

The luxury of butter is obtained at a great expense of human labour, viz. nearly 4½*d.* per pound, as appears by the preceding calculations. A pound of butter costs as much as six pounds and three quarters of farmer's bread; yet who will suppose there is an equal disproportion in their powers of nourishing the human frame? Land of 20*s.* rent applied to dairying, costs in human labour about 7*s.* per acre less than when in

the state of arable; but as I imagine half the price of the butter is paid for the *taste* of it, and the other half for its *nutritive* qualities, it is probable that fifty acres of arable, are more effective in the support of animal strength, than 100 acres of the same value when applied to dairying.

There are very few farmers who keep regular accounts of receipts and expenditure, except those who manage the business of others; and even where this is the case, I have seen the most convincing reasons to believe, that as they are not kept with a view to elucidate the nature and extent of the expense incurred in the various operations of agriculture, they are capable of affording every little illustration of the subject under discussion. The sums of money that are paid or received, may be duly registered; but with them is seldom specified the precise nature or extent of the business to which they belong.

We are not told what part of a man's weekly pay has been earned in weeding, or holding of ploughs, &c. or even if that is the case, still the particular field or fields are not specified. The blacksmith, wheeler and collar-maker's bills are paid at uncertain times, and belong in part to one year, and in part to another, and also vary considerably in their amount. The corn of half, or three-fourths, or a field and a quarter of another, is put into one barn, or mixed together on the stacks, especially in large farms, so as to render it impossible in many cases to ascertain the produce of particular fields. The produce of particular pastures is also, in general, mixed in such a way among the sheep, cows, horses, and pigs, that the manager or farmer of 100 acres could scarcely make out a satisfactory account of his expenses and profits, without neglecting business of far more importance to his own interests.

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1 acre.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.	100. 0 quart. 241.
	ters per acre.	Wheat, 14 loads, at 50s. 4 loads per acre, 35L	ters per acre.	ters per acre.	ters per acre.	quarters per acre.	quarters per acre.	quarters per acre.	quarters per acre.
105 0 0	105 15 0	59 0 0	281 5 0	101 5 0	98 14 0	375 7 6	1759 14 6		
34 19 6 $\frac{1}{2}$	66 2 3 $\frac{1}{2}$	8 12 4 $\frac{1}{2}$	135 19 5	36 4 11 $\frac{1}{2}$	22 2 7 $\frac{1}{2}$	241 9 10	340 11 1 $\frac{1}{2}$		
gain.	gain.	loss.	gain.	gain.	gain.	gain.	gain.		

There is a mis-statement in two other cases, of which an explanation cannot be now obtained.

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CHAP. V.

IMPLEMENTS.

SECT. 1.—PLOUGHS.

THE plough which has been long in general use in this county, possesses no characteristic worthy of recommendation. The mould-board is generally a flat piece of wood, which being placed in a vertical position, frequently needs the assistance of something like a wedge to be nailed on the hinder part, to enable it to turn the furrow. The capstan, provincially the cock, is fixed to the beam-end in a horizontal position by a bolt. It has usually no more than three notches, which are used to turn the plough to the right or left, according to the width of furrow required, while the depth is incapable of alteration, except by difficult and insufficient means. The handle on the right hand side is loose, and is called the plough-staff. The lower end consists of a hook of iron, which is used in clearing the dirt and weeds from the mould-board and coulter, and is also necessary to enable the ploughman to swing the plough into its proper position for beginning a new furrow.

It is probable that more than half the ploughs in the county are at present as above described, but a considerable improvement in the construction has taken place in several parts, as in the vicinity of Woburn, of Harrold, &c. In ploughs of the improved construction,

struction, the handles are both fixed; a *paddle or spud* is used for clearing away the dirt and weeds, and the mould-board, though made of wood, has a considerable curvature.

The cock or capstan is placed in a vertical position, and is moveable toward the right or left, a sufficient distance to admit of its being drawn by a team at length, or a pair of horses double, according to circumstances. These are termed *tee-headed ploughs* in the south of the county, but in other places they are often called *cross-headed* or *cat-headed*, from the piece of wood that is put across the end of the beam, to regulate the oblique position of the capstan. The expense of one of these ploughs is, in the central parts of the county, as follows:

Wood work,	£.0	18	0
Plough-shoe and ground-wrists,	0	3	0
Bottom plate,	0	3	0
Coulter, 8lbs. at 6 <i>d.</i>	0	4	0
— plates and wedge,	0	1	3
Shar, 19lbs. at 8 <i>d.</i>	0	12	8
Cock, or capstan,	0	5	0
Shar-hook and holdfast,	0	2	6
Total,	£.2	9	5

It is supposed that one of these ploughs will last two years, but it will require new heading, as it is termed, or a new mould-board, &c.

The Norfolk plough has been used by several gentlemen and farmers, but its reputation appears to have declined in this county. Such as assert that wheels are, in all cases, useless incumbrances, will of course disapprove of the complicated machinery of a Norfolk plough,

plough, the utility of which is not very apparent. Mr. Foster, of Bedford, observes, that "upon stiff soils, and high ridge and furrow, or on the sides of steep declivities, it is found rather unmanageable and top-heavy; and the men, after a full trial of both, gave the preference to the two-wheeled Leicestershire plough, made at Hathern, near Loughborough, which has been much approved for these soils, at our prize ploughing at the annual agricultural meeting."

A wheel adds much steadiness to the motion of a plough; and the Leicestershire plough here mentioned, having two wheels, possesses an additional advantage of this kind: but the Norfolk plough—judging from one that was used at Lidlinton for three or four years—is more unsteady in its motion, if the ground be in any degree hard, than a common swing-plough.

The merit of the Norfolk plough has been said to consist in its capability of turning a wide furrow—as 12 inches—in a very complete manner; but this is a circumstance which depends entirely on the shortness of the mould-plate, and the width of the heel, or hinder part of the plough, and might be performed by a common swing-plough, with a Norfolk mould-plate fixed in the same position.

Some of the advocates of this implement assert, that it requires less power, in proportion to its work, than other kinds of ploughs; but the position of the mould-plate before mentioned, seems more likely to produce a contrary effect, and the lightness of draught does not appear, in wheel-ploughs, to have any connexion with the length of the beam.

The Hertfordshire plough is in general use on the stony soils to the south of Dunstable, and it generally employs four horses double, and sometimes six or eight.

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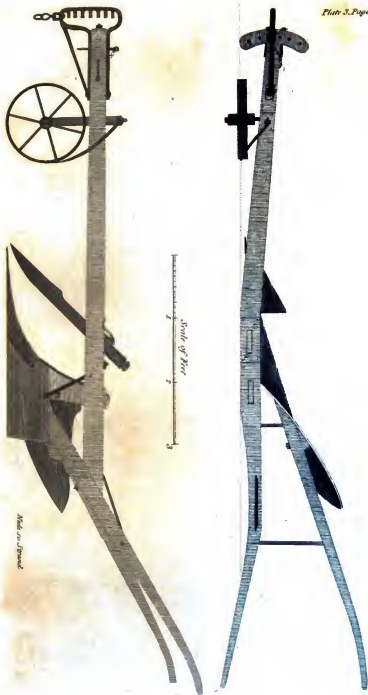
That the point of the share should be very long, is said to be an essential circumstance in the ploughing of stony soils; in other respects, the merits of this clumsy implement seem to depend entirely on its weight, and to this may be properly added the weight of the ploughman, whose power is often too little to counteract the jerks of the plough, when the point of the share meets with a large stone.

The ploughman walks on the unploughed ground, and leans toward the plough in an angle of about 30 degrees, the necessity of which is probably owing to some fault in the construction of the implement.

The two-furrowed plough is not unknown in this neighbourhood; but the time of its use has been generally terminated by the decay of the implement, which, though capable of making good work on light sandy soils, seems little calculated for hard, dirty, or unlevel ground. It is frequently necessary for the horse which is nearest to the plough, to draw it a yard or more at the ends of the land without the aid of the other horses, which with a double plough is a considerable inconvenience; and as two double-horse teams will perform as much or more work than four horses with a double plough, there does not appear any powerful reasons to recommend them to general use.

The Rev. Dr. Cartwright invented a three-furrow plough, which was recommended for expediting the sowing of turnips, &c. on light soils, and ploughs of this description can scarcely be expected to succeed under any other circumstances. There is much difficulty in ploughing a stiff soil with a single plough, and when this difficulty is doubled or tripled, the chance of success is more than dubious.

Two or three one-handed ploughs have appeared in
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this county, but, I believe, without convincing the farmers that two are not better than one.

The ploughs that have been used for the last few years by the Duke of Bedford's bailiff, at the Park farm, are made upon the construction which is recommended in the publication of Mr. Bailey, of Northumberland, the iron mould-plate of which is said to be constructed on mathematical principles. No material objection has been made to the Northumberland plough, or to the principles laid down by its ingenious inventor, except that he treats the merits of a wheel with too little ceremony.

Under this persuasion, a plough was made at Liddington; with such deviations from Mr. Bailey's, in the arrangement of the wood-work, as are exemplified in *Plate III.*

The utility of a wheel in the ploughing of a hard fallow, is generally believed in this county; and such as have not a wheel to their fallow-ploughs, make use of an iron *foot*, which, having a flat bottom, slides over the ground, and produces the same effect. The supposition that a wheel increases the draught of a plough, is probably ill founded, as, by regulating its depth, the draught is rendered more steady, which is of more consequence than appears at the first sight. It is usual to fix a heavy iron wheel to malt-mills, &c. which are to be worked by hand labour, the *vis inertiae* of which is intended to regulate, but by no means to diminish, the quantity of labour required.

Now if a regularity of power or force is found most favourable to the muscular exertion of man, it is of course equally so to that of the horse.

It is found proper in practice, to give the wheel of a plough a slight inclination towards the horse-path.

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In many modern ploughs, the beam receives a considerable curvature, which at the same time diminishes its strength, and adds to its cost. If this curvature is intended to give more room for weeds which may accumulate under the beam, this purpose is effected only by an inconvenient length of coulter, which makes it unsteady, and if the coulter be fastened by a hook, &c. the space that was gained by the elevation of the beam in the middle, is again taken away by the hook and screw, which of course, to say nothing of the expense, renders the whole scheme abortive. The apparatus of iron bars and chains, which is sometimes made to pass several inches below a crooked beam, appears, to me at least, to answer no other good purpose than that of shewing the most proper position of the beam itself. This apparatus is generally fastened by an iron pin, immediately behind the mortice of the *sheath*, where the plough-beam is most liable to break, and which this offers no means of preventing. A plough of this construction was tried on a piece of hard ground at the Woburn sheep-shearing of 1806; but it was found necessary to desist, to prevent the beam, which was heard to crack, from breaking, notwithstanding the mysterious powers which have been ascribed to the chain, &c.

The most eligible means of preventing a plough from breaking in the part above-mentioned, will perhaps be found in the iron brace, which may be seen in the Plate.

The share of the Northumberland plough has no kind of fastening, being merely fitted on the lower end of the sheath, which is found sufficient for most kinds of work; but if greater safety be thought desirable, it may be obtained, as is the case in Mr. Foster's Leicestershire plough, by an iron brace, one end of which
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must be hooked to the upper part of the share on the land side, and the other fastened by a thumb-screw at the top of the beam, as near the handle as is convenient.

The iron mould-plates are very useful on all dry soils; but where the soil is of a gluy tenacious nature, as at Harrold, &c. the farmers contend it would be impossible to use them, when the soil is moist. It is a common practice to take off the iron plates whenever a plough is used on clays when in a moist state, as at wheat-sowing. Every inequality of surface has also a tendency to hold the dirt, even the hole through the *wing* of the share, which is used for fastening it on, and which is common in the south of the county, is disapproved north of the Ouze, and a kind of staple behind the wing supplies its place.

The expense of a Northumberland plough, or of one similar to that delineated in the Plate, is nearly as follows :

Wood-work and making,	£.1	1	0
2 shares, 29½ lb. at 1s. per lb. (only one } charged),		0	14 9
Cast iron mould-plate, 42 lb. at 4d.		0	14 0
12 small irons of various kinds,		0	6 0
Coulter, 8 lb. at 6d.		0	4 0
—— wedge and plates,		0	1 3
Cock 5s. plates, &c. 1s.		0	6 0
Cast iron mandril to make the shar on, 18 lb. } at 4d.		0	6 0
		3	13 0
A wheel, &c.		0	17 0
		£.4	10 0
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The common wheel-wrights cannot be depended upon for accurate workmanship, in cases where they have not had some practice; consequently, ploughs of this kind are scarcely to be obtained in this county, even without a wheel; at a less price than five guineas.

The account of trials of the merit of ploughs, which were made at the Woburn sheep-shearing of 1803, is extracted from the *Annals of Agriculture*, vol. xl. p. 502.

“The trials were made in detail, one plough at a time, in order that the force exerted might be measured by the machine for ascertaining that force:

	<i>Force.</i> <i>Cwt.</i>	<i>Breadth</i> <i>of</i> <i>Furrow.</i> <i>Inches.</i>	<i>Depth</i> <i>of</i> <i>Furrow.</i> <i>Inches.</i>
The Northumberland plough, ...	$2\frac{1}{2}$	10	$4\frac{1}{8}$
The double-furrow plough, 5 cwt. } therefore,	$2\frac{1}{2}$	$9\frac{1}{4}$	$5\frac{1}{2}$
The Norfolk plough (Park farm),	$2\frac{1}{4}$	11	$6\frac{1}{8}$
The Norfolk plough (Maulden farm),	$3\frac{1}{4}$	$13\frac{1}{2}$	$5\frac{1}{2}$
The Bedfordshire plough (Mr. } Barlow's),	$2\frac{4}{7}$	$10\frac{1}{4}$	$5\frac{1}{8}$
The Bedfordshire plough (Dr. } Macqueen's),	$2\frac{8}{11}$	10	$5\frac{1}{2}$
Mr. Salmon's one-horse plough, } with a wheel at the heel,	$1\frac{4}{7}$	$10\frac{1}{2}$	$4\frac{1}{2}$

“Suppose a yard of furrow, calculated by multiplying the length by the breadth, and that product by the depth, the result is the number of cubic inches; and then by proportioning the force to 1000 cubic inches, the general result will be seen at once.

<i>Ploughs.</i>	<i>Force. Cwt.</i>	<i>Depth. Inches.</i>
Northumberland,	$1\frac{1}{2}$	$4\frac{7}{8}$
Double-furrow,	$1\frac{1}{2}$	$5\frac{1}{2}$
Park farm, Norfolk,	1 less a fraction, ..	$6\frac{1}{8}$
Maulden farm, Norfolk, ..	$1\frac{1}{4}$	$5\frac{1}{2}$
Mr. Barlow,	$1\frac{1}{10}$	$5\frac{1}{8}$
Dr. Macqueen,	$1\frac{1}{8}$	$5\frac{1}{4}$
Mr. Salmon,	1	$4\frac{1}{2}$

“ The column of depth is added, that the reader may estimate in his own mind, the superior resistance of any given depth *at the bottom* of the furrow, over a like depth at the surface.

“ Some doubts having been expressed as to the accuracy of the result when thus determined (though I ought to observe, that these calculations were not made before the Judges drew up their decision, who attended also to the goodness of the work), a few trials were made the next day, the result of which follows :

Mr. Salmon's plough.—Share six inches and a half broad.

	<i>Force. Cwt.</i>	<i>Breadth. Inches.</i>	<i>Depth. Inches.</i>
1st experiment,	$1\frac{1}{4}$	$9\frac{1}{2}$	4
2nd ditto,	$1\frac{1}{2}$	9	4
3d ditto,	2	10	4
4th ditto,	2	10	4
5th ditto,	$2\frac{1}{2}$	11	4
6th ditto,	2	10	4
7th ditto,	$2\frac{1}{4}$	12	$4\frac{1}{2}$
8th ditto,	$2\frac{1}{2}$	10	5
9th ditto,	3	$10\frac{1}{2}$	5
10th ditto,	3	10	5
11th ditto,	3	10	$5\frac{1}{2}$
12th ditto,	3	11	$5\frac{1}{2}$
Average,	$2\frac{4}{11}$	$10\frac{3}{11}$	$4\frac{6}{11}$

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“ Some of the furrows were rice-baulked.

“ The Northumberland plough.—Share seven inches and a half broad.

	<i>Force.</i> <i>Cwt.</i>	<i>Breadth.</i> <i>Inches.</i>	<i>Depth.</i> <i>Inches.</i>
1st experiment,	$3\frac{1}{2}$	10	$4\frac{1}{2}$
2nd ditto,	$2\frac{1}{2}$	9	$4\frac{1}{2}$
3d ditto,	3	$9\frac{1}{2}$	$4\frac{1}{2}$
4th ditto,	$2\frac{1}{2}$	$9\frac{1}{2}$	$3\frac{1}{2}$
5th ditto,	$3\frac{1}{2}$	10	5
6th ditto,	4	10	6
Average,	$3\frac{1}{8}$	$9\frac{4}{8}$	$4\frac{4}{8}$

“ Furrows rice-baulked.

“ The Norfolk plough.—Share seven inches and a half broad.

	<i>Force.</i> <i>Cwt.</i>	<i>Breadth.</i> <i>Inches.</i>	<i>Depth.</i> <i>Inches.</i>
1st experiment,	4	$10\frac{1}{2}$	6
2nd ditto,	$3\frac{1}{2}$	$10\frac{1}{4}$	$4\frac{1}{4}$
3d ditto,	3	10	$4\frac{1}{2}$
4th ditto,	$3\frac{1}{2}$	12	5
5th ditto,	3	11	4
6th ditto,	3	9	$4\frac{1}{2}$
With a share $8\frac{1}{2}$ inches wide:			
7th ditto, } average,	$2\frac{1}{2}$	$10\frac{1}{2}$	5
8th ditto, } 3 inches, $10\frac{1}{2}$ inches,	$3\frac{1}{2}$	11	$4\frac{1}{2}$
9th ditto, } $4\frac{1}{2}$ inches,	3	10	5
Average,	$3\frac{1}{9}$	$10\frac{4}{9}$	$4\frac{6}{9}$

“ The furrows were rice-baulked with the $7\frac{1}{2}$ inch share, but much better with that of $8\frac{1}{4}$.

“ Per

“ Per 1000 cubical inches.

	<i>lb.</i>	<i>Depth.</i>
Mr. Salmon's plough,	146	$4\frac{6}{11}$
The Northumberland,	218	$4\frac{4}{5}$
The Norfolk,	205	$4\frac{6}{9}$
Ditto, broad share,	182	$4\frac{7}{8}$

“ The result of this trial must not be considered as any impeachment of the former decision ; for when force and furrow are combined, conclusions from one experiment will not generally be applicable to another : these tables do not explain the merit of the furrow in form and cleanness, and the Norfolk is here superior in depth.

“ The application of a wheel at the heel of a plough was, I believe, originally the thought of Mr. Francis Moore, a linen-draper in Cheapside, who took out a patent for it above 20 years ago. His wheel was in a vertical position ; Mr. Salmon's is in a diagonal one, which he finds better, and his plough has a great singularity in the draught being applied to the coulter. It was a roughly-finished implement, but promises, I think, from his mechanical ingenuity, to be improved into a valuable tool.”

Thus far Mr. Young ; and I believe a due consideration of the experiments which he has recorded, will prove, that no unequivocal result can be deduced from them, so far as respects the comparative merits of any of the ploughs, with the exception, perhaps, of the one-horse plough of Mr. Salmon.

The difference in the draught of the Northumberland and Norfolk plough (218—205) is less than the difference of the two Norfolk ploughs, viz. 1 cwt. and $1\frac{1}{4}$ cwt. ; and the draught of the two Bedfordshire

ploughs is less than one of the Norfolks and the double plough ; while the plough on which Mr. Bailey bestowed so large a share of attention and experiment, is cast entirely into the back ground, as a heavy-going implement.

The machine which was used for measuring the draught, was made on the principle of the spring steel-yards, with an index, the vibrations of which were taken on an average, as the inequalities of hardness in the ground, and the irregular pulls of the horses, seldom permit it to remain stationary.

In the use of this instrument, the relative pace of the teams must not be disregarded ; as, if one pair of horses walk after the rate of two, and the other three miles in an hour, the conclusions, which refer only to the index of the spring steel-yards, may be directly opposite to the truth.

Another source of error will be found in the different degrees of skill in the ploughmen, which, in the opinion of some, is more conspicuous than the different merits of the ploughs. Hence it may be observed, that the same individual ploughs, whether Leicestershire, Norfolk, Northumberland, or any other, have repeatedly won and repeatedly lost the prize, at the agricultural fêtes in this and other counties.

If such is granted to be a true statement of the case, it will appear that several days, rather than a few hours, are necessary to investigate the merits of ploughs that appear in competition with each other. The remark of Mr. Young, in the foregoing quotation, on the adding the column of depth, " that the reader may estimate *in his own mind*, the superior resistance of any given depth *at the bottom* of the furrow, over a like depth at the surface," may be adduced as a proof, that

that the relative resistance of various depths and widths of soil is a necessary, and, indeed, a primary object of investigation. In a trial of this kind, it is probable that a two-wheeled one-furrow plough would be the most eligible, as it might be set at the various depths and widths, and depend but little on the skill and attention of the ploughman.

It need scarcely be observed, that the soil should be in a medium state of dryness, and as free from stones and irregularities of surface as possible.

In the foregoing experiments it is shewn, that the width of the share may be an object of consequence; and it is very probable, that the sharpness of its point and edge, as well as the make, and form of setting the coulter, are worthy of consideration.

The friction of the ground-rist, land-side, and bottom of the plough, is known to add considerably to the draught of it. Under the impression of this consideration, Mr. Salmon invented the plough which was exhibited in 1803, and in which no part of the body of the plough touched the ground, except the share and coulter. The plough was of course supported upon wheels; and as the tendency of the point of the share towards the unploughed ground is, in common ploughs, resisted by the land side of the *neck*, it was found necessary by Mr. Salmon, to place the wheel in a diagonal position, by which it resists both the horizontal and vertical tendency to deviate from its proper place.

The draught of this plough, compared with that of the Northumberland, according to the statement of Mr. Young, is as two to three, which is considerable, and renders it a subject of regret, that the only instance of an attempt to improve a single plough, which was probably called into existence by the stimulus of

His Grace the Duke of Bedford's premium, has been suffered to be forgotten.

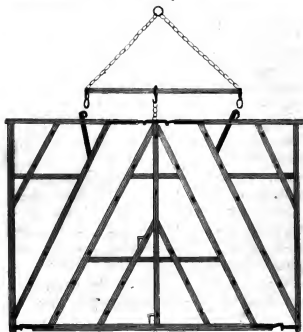
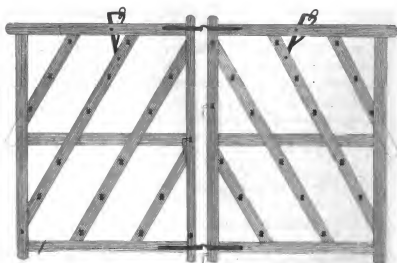
Mole-ploughs, have been used in several parts of the county, but there is nothing peculiar in their construction. They have sometimes a coulter which precedes the mole, but in others, such as that used by Mr. Foster, of Bedford, the place of a coulter is supplied by a steel wheel with a cutting edge, half of which is below the beam.

SECT. II.—HARROWS, SCUFFLERS, &c.

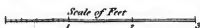
THE harrows of Bedfordshire boast of no peculiar merits, unless perhaps those of cheapness, and facility of construction.

Each harrow is composed of five beams two inches and a half square, which are held in their places by four flat pieces of wood, about three-fourths of an inch thick, which pass through a mortoise in each of the beams. Sometimes two of these *shittles* are made round, and occasionally of iron. Five tines are inserted in each beam, ten inches asunder; and as the beams are also ten inches apart, the whole of the tines are in a square position with respect to each other. The harrows are mostly joined together in a very loose and awkward manner, and are drawn in an oblique direction, without any regard to the number of tines that may follow in the same track.

The wood-work of a pair of common harrows costs about 20s. though not so much in the north of the county. Fifty tines of about eleven inches long, will
weigh



Made at Grand.



weigh 65lb. which, with the couplings, &c. make the cost of a pair of common harrows about 3*l*.

Mr. Brown, of Duntun, has a harrow which consists of only two rows of tines, which run across the hind part of a triangular frame. The tines are considerably distant, to permit them to penetrate deep in foul land, where their utility is most apparent.

Harrows on the same principle, but not precisely the same form, as those exhibited in *Plate IV.* have been tried at Liddington, in the construction of which it was attempted to place the tines in such a manner, that each of them should perform its share in the business, by which means the land will be done as effectually at the outside of the harrows as in the middle, which is far from being the case in those which are generally in use.

But the advantage which is, as far as I know, peculiar to these harrows, consists in that arrangement of the tines, by which every kind of obstruction will pass through the harrows with a facility which is very beneficial to their operation. It may be seen by inspection of the Plate, that the tines which follow each other in the beam, and which are not liable to clog, are placed at the distance of ten inches from each other, while those in a parallel direction, are no less than fifteen inches asunder; and as the tracts of five other tines pass between each parallel pair, the soil is moved in regular portions of two inches and a half to each tine.

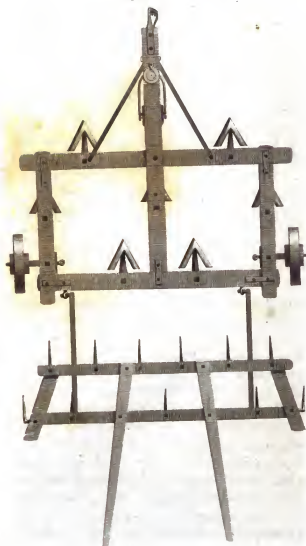
In the desire to add elegance to utility, every one will see the propriety of making both sides of the pair of harrows of a similar construction; but this object cannot be obtained without some little irregularity in the position of the tines, toward the middle of the harrows.

There are two positions marked for the central tine, in the foremost of which the tines on each side of it are at the distance of twelve inches and a half, instead of fifteen; and as the harrows clog in that part, if they clog at all, it serves to shew the utility of the plan.

It seems more eligible to place the central tine, which must be a shouldered one, and screwed through the couplings, in the hinder part of the harrows. If a uniformity of appearance is disregarded, and its value is surely but little, the inconvenience at the middle of the harrows may be obviated by making all the beams pass in one direction, without meeting as it were in the middle.

Fig. 2, represents a pair of turnip-harrows, in which the parallel tines are twelve inches asunder. These harrows are divided into three parts in the plate; but as none have been made on that plan, it may be impossible to ascertain what advantages or disadvantages may attend that mode of construction. The two outer wings of the harrows may be extended to any width that might be deemed desirable. The square form is also capable of every variety of size, and number of tines, if the systematic arrangement of them be not altered. The external corners at the fore-part of the harrows, may each of them receive an additional shouldered tine, or the corners may be taken away, and the frame be made in the manner which is represented by dotted lines; but in this case it would require more skill and care in the workman, and might at first sight be supposed, though erroneously, on the same plan as Mr. Lester's. The form is however of very trivial consequence, and the mode of placing the tines is all the merit to which they have any pretensions. The mode of drawing the harrows is by double swivel.

Scuffer



Note on Strand

swivel-trees, which are hooked to the chain, &c. represented in *Fig. 2*, by which means the danger of their turning and injuring the horses, is entirely prevented.

The irons by which these harrows are drawn, are made to reach some inches below the first beam, to prevent that undue pressure upon the fore-part of the harrows, which in those of the common kind, is remedied by making the first tines the shortest.

The expense of a large pair of harrows of this description will be as under :

Thirty-seven tines, 86 lb. at 6d.	£.2	3	0
Couplings, screw-pins, draught-irons, &c.	1	5	0
Wood and making (beams two inches and a half by three),	2	2	0
Total,	£.5	10	0

Scufflers are not much used in this county, though they are very beneficial in cleaning foul land of every description. In *Plate V.* is a representation of the third which has been made at Lidlington, and which differs from the former, in the placing of the hoes at greater distances, to prevent their clogging, making them stronger, steeling their points, &c.

The principal dimensions of this implement are as follows: beams, four inches square; hoe standards one inch and a quarter square; width of winged hoes, nine inches; hoe tracks, nine inches asunder; diameter of wheels, fifteen inches; width of the wheel rims, three inches.

A considerable degree of strength is necessary in all implements of this kind. The plates through which
the

the hoe standards pass, should be one-fifth of an inch in thickness, and should be made fast to the beam by two rivets passing through each pair, with nails in addition. Each of the joints should also be fastened with plates and screw-pins. The most convenient mode of fastening the wheels is by means of a screw, which passes through a plate that is held to the beam by two screw-pins. The first wheel, which is a castor, is fastened by a nut, or ring of iron, which is screwed to the round standard, or supporter of the castor. The standard passes through a plate of iron, both above and below the nut, which is fastened on different parts of the standard, to regulate the depth. It will occur to every one acquainted with mechanics, that a castor-wheel may be made, if it be thought proper, without a cylindrical or moveable standard.

The beam which supports the first wheel, is screwed to the frame of the scuffler, and is made fast by two strong braces. This beam has also a curvature upwards, by which means the bottom of it is about four inches above the upper level of the square frame, which was necessary to make room for the first wheel which runs under it. The cock by which the implement is drawn, is turned considerably downwards, to prevent an improper pressure on the castor-wheel. The seven hoes reach about fifteen inches below the frame, and weigh about 13 lb. each.

A harrow to follow the scuffler, is of great utility, and may be made in a variety of forms.

The iron arms by which it is drawn, should be made of bars an inch square, and the tines should be a foot long below the beams, and bent forward very considerably. The handles, which are here indispensable, would be of much utility to other kinds of harrows. A shim, or scraper,

scraper, might be inserted in the harrow-frame, for cutting thistles and other weeds from the surface of lands which it may not be convenient to plough.

Mr. Brown, of Dunton, and some others in that neighbourhood, use an implement of this kind for cleaning lands late in the summer, which is a time when some think that ploughing of fallows previous to wheat sowing, is rather injurious than beneficial.

SECT. III.—DRILL MACHINES.

THE merits of the drill husbandry are so little attended to in this county, from the peasant to the peer, that it may be expected that the implements which are occasionally employed are not always in the first rate of merit, and that the defects of the implements are not unfrequently charged on the husbandry itself. Defective implements are however not peculiar to Bedfordshire, as, notwithstanding the numerous attempts of ingenious mechanics to improve the drill machine, most of which serve to shew that the attempt is pregnant with no trivial difficulties, it does not appear that a good drill machine, applicable to general purposes, has at present been offered to the public.

The Rev. Selby Hele, of Colmworth, has a machine that drills four rows at once, with intervals of twelve inches between each row. The fore-part of the machine is supported on a single cast-iron wheel, which turns five spur-wheels, placed one above the other, the fourth of which is fixed on the roller that delivers the seed, and the fifth turns a kind of a rake, which moving among the corn in the boxes, prevents it from
forming

forming a kind of arch over the roller, and rendering the delivery unequal. The motion of the wheels is stopped at the ends of lands, &c. when the machine is not required to deliver the corn, by a hook which passes between the spokes of the cast-iron wheel, and can be moved at pleasure by the foot only.

This machine, after being tried for, I believe beans only, was laid aside; a result which is not at all extraordinary, as it possesses no brushes, or any other means of regulating the quantity of seed; and the distance between the rows being necessarily either 12 or 24 inches, is probably not very proper for either pulse or white-strawed corn.

Mr. Pedley, of Great Barford, has a machine which drills two rows only; and the wheel which turns the seed-cylinder is fixed upon it, and occupies the centre of the hinder part of the machine; in consequence of which arrangement it appears probable, that if the ground is not very level, the wheel will sometimes lift the drill ploughs out of the ground, and thus hinder the corn from being covered, and at other times the ploughs will lift the central wheel from the ground, and thus prevent the delivery of the corn from the roller. This machine also contains a contrivance to prevent the arching of the corn in the boxes, by a horizontal motion of a kind of rake, which is communicated to it once in every revolution of the hinder wheel; and the rake is returned to its place by means of a spring. This implement resembles the former also in the want of brushes, or other means of regulating the delivery of the seed, and is of course not likely to promote the adoption of the drill husbandry.

The one-rowed drill-plough has been occasionally used in the vicinity of Ampthill, &c. for some years,
and

and has been employed about Leighton for drilling of wheat. Some of these implements resemble the Norfolk plough, having two wheels on the fore-part. The roller which delivers the seed, is notched or grooved, and the delivery is regulated by a brush. The wheel which turns the roller is from 18 to 24 inches distant from the body of the machine, and is connected with it by the simplest kind of universal-joint; thus,



which permits the various sidelong motions of the machine to be made, without obstructing the revolutions of the seed roller.

The principal defect of this kind of drill is the slowness of its work, and the impossibility of guiding it in a straight or regular line, by which horse-hoeing is entirely prevented.

The Rev. Mr. Cook's patent drill machine has been used by several persons in this county, and it is perhaps superior, on the whole, to most of the others, but is nevertheless defective in several essentials of a good drill. This machine is praised for the certainty of its delivery, but its inherent property of sowing too much corn when ascending hills, and too little when descending them, makes it almost impossible to use it to any good purpose in drilling across ridged lands; and even in those instances where the unevenness of the ground is less surdlen, the means employed to counteract this tendency of sowing unequally, are too troublesome to be well attended to; as to guide the machine in a tolerable straight line, is sufficient to occupy the attention of both a leader and holder of considerable care and experience. In drilling pease by the side of a hill, they will often fall out of the lower end of the seed-box, and
this

this defect can be no otherwise counteracted than by drilling the corn very thin in such cases, which is a remedy by far worse than the disease.

The principal merit of this drill, as distinguished from many others, consists perhaps in the horse-hoe, which makes as it were a part of the machine, and the power of drilling turnips and other small seeds as well as corn, which is seldom effected by any of the machines with wooden rollers. Yet even in this part the drill is defective, as by drilling turnips in eighteen-inch rows, I believe that less than half a pound of seed is sown on an acre, which, as has been seen in Liddington, is a very hazardous species of saving, and would in many cases, as of indifferent seed, dry weather, &c. prove very injurious to the future crop, and cause the machine to be laid aside.

The machine used by the Rev. H. Y. Smithies, of Little Staughton, is an improvement on Mr. Cook's, of which, it seems, that Suffolk affords many instances. The coulters or drill-ploughs are capable of being set as near each other as six inches and three quarters, for drilling barley, and afterwards red clover between each row of corn. To effect this purpose, it was found necessary to place the coulters in two rows, the former of which is perhaps four inches before the latter, which in a great measure prevents the dirt and other obstructions from lodging between them, and injuring the work. The coulters do not pass through a beam, as in other machines, but are inserted and fastened at the top by a screw, in a socket of iron, from the centre of which socket a screw-pin passes through the coulters beam in a horizontal direction, and is fastened by a screw at the fore-part.

Another improvement consists in the use of various
sized

sized wheels on the cylinders, which deliver the corn, &c. from cast-iron cups.

Mr. Smithies, of Little Staughton, and Mr. Foster, of Bedford, are perhaps the only drillers in the county who use the drill in the Suffolk manner, which is performed by fixing the shafts of the machine before one of the wheels instead of in the centre, by which means the horse may go and return in the same path, which is left sufficiently wide for that purpose between every second draught of the machine.

This mode of draught is obviously inconvenient to the horse, by the pressure against one of his shoulders, in consequence of the body of the machine being entirely on the other side; but this is said to form no material objection to the practice.

The machine used by Mr. Bricheno, of Biggleswade, is one of Mr. M'Dougal's invention, in which a large wooden roller (one side of which is surrounded by brushes) is substituted for the cast-iron cups, &c. of Mr. Cook's machine, and apparently with some advantage in point of regularity of delivery, and less variation of quantity in passing over unlevel ground; but this machine possesses no guiding principle, depending, in this respect, entirely on the motion of the horse.

His Grace the Duke of Bedford has a small drill-barrow, made by the same mechanic, and on a similar principle, which is turned by means of a double crank, connected with the single wheel in the fore-part of the drill, with an apparatus, also, for preventing the corn from arching, or lodging in the seed-box. This machine is capable of drilling a single row of either turnips or corn; but there are obvious causes, which will prevent corn from being drilled with hand-machines.

At

At the Park farm at Woburn may be seen a drill, which is capable of drilling seven rows at a time. The coulter is moveable in such a way, as to accommodate themselves to the inequalities of the ground over which they pass. The cylinders which deliver the grain are composed of brass and iron, and the parts composed of the latter metal are moveable at pleasure, while the machine is at work, in such a way as to increase or diminish the cavities which contain the corn, by which means a greater or less proportion of seed may be sown, according to the variable quality of the soil.

This is called the Northumberland drill, and was invented, I believe, by Mr. Bailey. It possesses the merit of sowing the corn at any distance required, and does credit to the ingenious inventor; but being a heavy unwieldy implement, and incapable of being guided in a straight line, it shares the fate of a great number of agricultural tools, namely, it is never used.

Mr. Jennings, of Harlington, has a drill-machine which cost 30 guineas. The rollers are fixed in brass frames, and turned by spur-wheels of the same metal.

The cavities or grooves which are made in the rollers to receive the corn, are very shallow, and Mr. Jennings believes they are the better on that account, being equally applicable to wheat and beans, and delivering the corn with much regularity. The delivery of the corn in this machine is regulated by a brass plate or tongue, which, contrary to the method of most other machines, leans against the lower semi-circle of the roller, thus :



towards

towards which it is pressed by a screw; and a small spring behind the tongue prevents, in a great measure, if not entirely, the crushing or breaking of the corn, which would otherwise frequently take place.

In most drill machines, the wheels follow the motion of the horse; but in this there are four fixed wheels, which render it in some measure independent of the horse; and if the first wheels leave their proper track, they must be forced into their place occasionally, by a proper pressure on the handles at the hinder part of the machine.

The corn which was drilled by this machine, appears to be drilled with as much regularity as is the case with most other machines; but the intervals between each draught of the drill are easily discovered by their varying width.

The ploughs are capable of no variation of distance, but are fixed for drilling turnips or beans at 22 inches, and white corn at 11 inches, either of which would go far, on a poor soil, to discredit the drill husbandry altogether.

Ducket's drill-marker, followed by the corn-dropper, is more generally used than any other machine, by the bailiffs of the Duke of Bedford, Lord Carteret, &c. The preference given to this machine is on account of the neatness of the work which it performs, as it is more capable of being guided in a straight line than any machine which has appeared in this county; but this is the only good property which belongs to it, and is obtained at an expense which is perhaps beyond its real value. The drill machines generally sow five rows with nine-inch intervals, by the use of a man, a boy, and one horse; whereas Ducket's marker and dropper clear but two nine-inch rows at each time, though they

BEDS.]

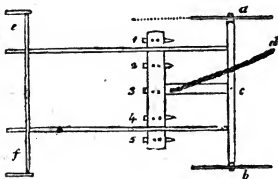
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employ

employ two men and a boy, and two horses, by which the ordinary expense of drilling is increased from 1*s.* to 4*s.* per acre, 3*s.* of which may be said to be the price of beauty rather than utility.

A few years since, Mr. Salmon, of Woburn, made a successful attempt to improve the guiding principle of drill machines, by making the wheels independent of the motion of the horse, for which he received the premium of 20 guineas, which was at that time offered by the late Duke of Bedford for the best newly-invented implement of husbandry.

The principle of this invention I have attempted to exhibit in a figure.



In guiding this machine, the wheel *a* is placed in the hollow or furrow which was made in the preceding draught of the machine by the plough marked 1; and the holder, taking the station of *e*, walks in a straight line after the wheel *a*, and guides it along the track of the plough 1, to the end of the land or field. In returning, he takes his station in the same manner between the handles *f*, and guides the wheel *b* along the track made by the plough marked No. 5.

No

No marker is required to serve as a guide for the horse, as he may swerve aside in an angle equal to that of the chain *d*, by which he draws, without much affecting the motion of the drill-wheel.

Any person of a tolerable capacity, will be enabled, with a little experience, to prevent the drill wheels from swerving more than an inch and a half on each side of the proper track, but as this degree of variation is too considerable for practice, it was found necessary that the drill ploughs should follow at the distance of a yard behind the wheels, to the axle of which they are connected by a loose joint at *c*. Thus the probable variation of the ploughs is reduced to about three-fourths of an inch, which in practice is scarcely perceptible. To effect this, however, it is necessary that the bottoms of the ploughs should be of a considerable length, to prevent the oblique motions, which would otherwise be caused by every hard clod or other obstruction that lay in the way. But if there is any propriety in drilling corn at so small a distance as seven inches, the length of the ploughs will be rather inconvenient, and will increase the obstructions to which most drills are liable from dirt, weeds, &c.

On a level and fine tilth, Mr. Salmon's drill is capable of such exactness and regularity, that the different draughts of the drill can scarcely be discovered; but on unlevel ground, and where some parts of the tilth are rough and foul, its motion is less steady, and its superiority over other drills disappears. If the ploughs on one side of the machine, meet with any obstruction, as a clung soil, or weeds which serve to accumulate the soil before the ploughs, or if they pass over high ground, which consequently lifts the ploughs on the other side out of their work, the centre of gravity

is changed, and the ploughs shrink, as it were, away from the obstruction, and cause a bend in the rows of corn which there is no means of preventing.

To prevent the corn from arching over the roller of a drill machine, is not a very difficult matter, and requires no machinery. About two inches of the roller should be appropriated to the delivery of the corn into each row; and if the passages that lead to the roller, be made three inches deep, and with three perpendicular sides, there is little, if any probability, that the delivery will ever fail for a single moment, as has been proved experimentally with wheat, barley, oats, and pease on the farm where these pages are written.

Mr. Jennings, of Harlington, effects the same purpose by a double hopper, which permits but a small quantity of corn to approach and press upon the rollers.

The requisites of a drill machine which would be capable of shewing the merits of that husbandry on all soils, are in my opinion as follow :

The size of the machine should not be very large nor very small; as if capable of drilling more than four or five rows at nine inches, it would sometimes prove too heavy in the draught for one horse; and on the other hand, a small one would not pay the expense of the machinery, which in a good machine will be found indispensable. It should be much more guidable than Mr. Cook's, or even Mr. Salmon's, and in some measure independent of the accidental and unavoidable swervings of the horse, and the irregularities of soil and surface. The ploughs should be capable of being set at any distance above six inches, and should possess the power, like Mr. Bailey's, of accommodating themselves to the inequalities of soil, and
not

not be liable to clog when the soil is moist, or not free from weeds.

The bottoms of the ploughs should be so narrow as to lay the corn in a straight line, not exceeding half an inch wide. The delivery should not, like Mr. Cook's, be rendered unequal by hills or ridged lands, and some easy means should be adopted, of stopping the delivery in any row that may not be wanted, in drilling lengthwise of lands, or in irregular fields.

The brushes should be capable of being raised or depressed, or the motion of the cylinder accelerated or retarded, or the size of the seed cavities enlarged or diminished, as in Mr. Bailey's, whenever the inequalities of the soil render it desirable to drill more or less corn per acre. The frame-work should be fitted to the cylinders in so complete a manner, as to render it capable of drilling the smallest seeds; and if the machine were capable of drilling light manures along with turnips, it would be an additional advantage. There is little doubt but that all these advantages may be obtained; the greatest difficulty is, perhaps, to make them consistent with ease of management, durability, and cheapness.

The attempts which have been made at Lidlington, to improve the construction of drill machines, embraced many of the *desiderata* before mentioned; but, as they have at present been very partially successful, they admit of no particular description in this place.

SECT. IV.—HOES.

THE hand-hoe, which being incapable of penetrating hard ground, and never passing much more than one inch deep, in any soil, was esteemed by the ingenious Jethro Tull as only fit to scrape chimnies, is the principal dependence for cleaning hoeing crops in Bedfordshire; but whenever it is desired to stir the ground to any considerable depth, recourse must be had to a horse-hoe. The instrument which is most effectual for hoeing of crops with wide intervals, is a common plough, but I am not aware that it is ever applied to that purpose by any farmer in this county.

The horse-hoes which are commonly employed, are made of a triangular form, the length of which is at least equal to the breadth, and ought to be considerably more. The hoes are made with a point at the fore-part, to enable them to make an impression upon ground which is too hard for the flat square hoe to penetrate, but principally to enable the twitch-grass, &c. to slide along the edges, and make its escape, without which it would be impossible to make any impression upon foul ground.

Mr. Jennings, of Harlington, however, makes use of hoes with a horse, that are square, like the common hand-hoes, which, where the ground is free from root-weeds, may work with tolerable freedom and success. His Grace the Duke of Bedford has some of these ploughs, or scufflers, in which five or six triangular, and semi-triangular hoes, are fixed in succession, to clear intervals of various widths; but in hoeing beans, &c. unless the ground is very friable and soft, they will scarcely make any impression upon

it. A principal fault in the construction of these machines, consists in placing the middle hoes toward the fore-part, in consequence of which, if any of the hoes miss their work, it will be those which go nearest the rows of corn, &c. In a bean-hoe of Mr. Grant's, of Leighton, I found the preceding arrangement very properly reversed, by placing the two widest hoes, or those which were to pass nearest the rows of beans, in the fore-part of the implement, as should always be done.

The hoes in this implement are square at the point, and are merely flat pieces of iron, bent forward in a curve. The central hoe, toward the handles of the machine, has a plate of iron fixed upon it, for the purpose of moulding up the rows of corn.

The instrument is seldom or ever used.

The expanding hoe of M'Dougal, has been tried in this neighbourhood, and is a useful tool for hoeing pease, &c. on light soils, but the mould plates are, in general, better off than on, being too long to permit the wings being set a proper width, without smothering the rows of corn with mould.

The fixed wheel of this instrument is rather prejudicial than useful, as, if the ground is hilly, the wheel is continually bearing toward the low ground, and is not easily counteracted.

By some trials that have been made by the Writer of these pages, it appears that an expanding hoe, with a short beam, and long pair of handles, is more guidable, and better adapted to unlevel ground, than any hoe with a single wheel, whether fixed, or, as is more proper, following the motion of the horse.

A short triangular hoe is, however, not guidable in this method; and it is observed, with respect to all

triangular or expanding hoes, that when they arrive at from twelve to fifteen inches wide, they become very inefficient in their operation upon couch grass, or upon binding soils; and three small hoes, set to the same width, or even a number of harrow tines, bent considerably forwards, are far preferable to be used in all such cases.

In the construction of horse-hoes, it is necessary that they should have two wheels to preserve the level of the machine, without which precaution the hoes on one side will sometimes go too deep, while those on the other side will be lifted out of their work.

The horse-hoe which has been used at Liddington, is on the same construction in a great measure, as that used by Mr. Runciman, of Woburn, which is, I believe, of the kind that is in use in Kent. The horse-hoe which is represented in *Plate VI.* is on the same principle, but with some additions which are intended to make it more generally useful. Some of these implements, which have been met with at Colmworth and Biggleswade, have two fixed wheels, and of course are less manageable upon unlevel ground, than if the wheels were guided by the horse. In the guidance of the wheels, shafts are sometimes used, as by Mr. Jennings of Harlington, but the manner of draught which is represented in the plate, is cheaper, and effectually answers the same purpose. The beam *a*, is covered with a plate of iron, which passes along the bottom of it, turns up at the ends, and must reach along the top of the beam so far as to include the screw pins which fasten the beams *b, b*, and may wholly enclose the beam *a*, if thought sufficiently easy to make. This plate must contain square and round holes, to receive the wheel-standards, and three screw pins, and two

screws

Horse-hoe.

Plate 6 Page 402.



Made in England.



screws must be inserted at the ends of the plate, to fasten the wheel-standards at their proper places. If the corn be drilled at no other distances than those of nine and eighteen inches, the wheels, which are set at a yard asunder in the plate, will never require any alteration; but if the corn be drilled at seven or fourteen inches, it will be desirable to set the wheels four inches narrower on each side of the machine. To effect this, the axles of the wheels must be made of a regular size, and sufficient length, and the position of the wheels must be regulated by moveable nuts and screws on each side of them, as seen in the plate. The wheels need not be more than fifteen inches high, and might be made to pass under the beam *a*, if desirable. The iron rims of the wheels should not be more than about an inch wide, which will prevent their doing much injury even to beans or pease. The heavy wheels of Mr. Cook's machine are more objectionable on this account.

The central beam should be fastened to the beam *a*, by a thick plate screwed to the lower side of each of them. This plate should be seven inches wide, and screwed sufficiently tight by the central screw-pin, to keep the hoes steady, and of a uniform depth on each side.

It is common to have no more than one cross-beam, in which the hoes are inserted either for seven, nine, fourteen or eighteen inch rows, as represented by the beam nearest the handles in the plate; but if only one beam is used, the middle one is sufficiently distant from the wheels for the purposes of guiding, viz. forty-five inches.

The cross-beam or beams, beside the central half
inch

inch screw-pins, require the additional fastening of iron braces.

The additional beams are inserted in the plate, to shew the method by which three narrow hoes, two before, and a central one behind, may be used for hoeing intervals, whether wide or narrow, in which a single hoe of the proper width will not penetrate to a sufficient depth. The holes in the two first beams, are intended to receive harrow tines, which, in hoeing nine inch rows, that are hard or foul, will work within an inch of the centre of the rows, on both sides. In hoeing of pease, &c. with broad hoes, it will be found sufficient work for a horse to clear two rows at a time, by the use of three hoes like those in Plate VI. at the end of the horse-hoe handles.

The width of the central hoe is fourteen inches, for eighteen inch rows, and its length ought not to be less than sixteen inches. It is found advantageous that wide hoes should consist of wings only, instead of solid plates, as the earth falls from them more readily.

In some horse-hoes it is common to use one hoe more than the number of rows that are drilled at once; the two outside hoes only clearing half a row at once, like those above described, which is done with a view to prevent destroying the corn where the work is irregular, but in the use of drills on the principle of Mr. Salmon's, this extra hoe is unnecessary, as there is, in general, very little danger of destroying the rows of white strawed corn.

There are various methods of fixing the hoes in their places, but perhaps the use of iron wedges may answer the purpose as well as any other contrivance.

They are sometimes fastened by means of a nut and screw

screw at the top of the beam; but others, such as Mr. Runciman's, of Woburn, are fastened by a screw that passes through a plate at the side of the beam, and presses against the hoe-standards. The plates into which the screws are inserted, are fixed to the beam by common screws that hold by the wood only.

The three-beamed horse-hoe is capable of being used on every kind of soil and every width of intervals, by making the holes in the beams in their proper places, and is capable, if made sufficiently strong, of being used as a scarifier, shim, &c. The proper size of the beams for hoeing, will be about three inches and a half wide by three deep, and the beam which is connected with the fore-part may be four inches wide by three and a half deep.

SECT. V.—ROLLERS.

THESE are commonly from seven to eight feet long, but it is evident that such as are only five or six feet long, would, if sufficiently heavy, prove more effectual in breaking of hard clods.

His Grace the Duke of Bedford has a drill-roller of cast-iron, which makes triangular hollows in the ground, six inches wide and four inches deep; it has wheels on the top of the frame, by which it is borne, with the frame reversed, when going to a distance; but I believe it has been but little used.

“An implement,” says Mr. Foster, “of great service to strong land, of which there is only one hereabouts, is the fluted iron roller, esteemed preferable to the spike-roller. When used in rough fallows, or upon clover-leys, ploughed up in dry weather in the end

end of summer, it will effect what no other tool in that case can, and prepare clods, otherwise unconquerable for the scuffle, or other implements. The finest and dryest season for working fallows, has often been lost for want of this tool, the ground lying in enormous clods, in which twitch and other weeds remain alive."

The fluted roller here mentioned consists of a cylinder of cast-iron, on which are placed flat rings of the same metal, at about five inches a-part; the whole is about five feet in length.

The Rev. Mr. Smithies has a roll which is drawn in the same manner as the drill, by which means one-half of the small ridges is rolled at each draught, without being trodden by the horse.



SECT. VI.—WAGGONS, CARTS, &c.

THERE is nothing peculiar in the construction of waggons: a common narrow-wheeled one costs about 32 guineas, and a cart about half as much.

The dimensions of a cart-body are generally as follows:

	<i>Feet. Inch.</i>	
Length at bottom,	5	6
Length at top,	7	2
Width at bottom,	3	1
Width at top,	4	1

In the carriage of corn, moveable *raves* are placed to keep the corn from pressing on the wheels; but a preferable mode is to fix them firmly to the body of the cart. The best mode of making the *copses*, which cover the horse's back, when carrying corn, &c. seems to be

be that in which an iron standard supports the fore-part, and the hinder part is pinned to the cart-body.

Much has been said on the proper form of wheels; but after all it must be confessed, that the common mode of making them, possesses some advantages, which are not attainable in any other way: the dishing or bevel-wheels, are supposed to be stronger than upright ones, as the rim or fellies, act as a kind of truss-work to keep them fast; and as the spokes which are downwards are intended to be perpendicular, the upper spokes, by their bend outwards, leave a space for the cart-body to bend in the same way, which, if the wheels were set upright, must be made considerably narrower.

Where the roads are bad, or the ground hilly, it does not appear that one horse could draw much more than the cart, however light it might be made; though upon level ground, it is common to see both hay and corn drawn by one horse in the common carts of Bedfordshire.

Mr. Grant, of Leighton, has a cart, the wheels of which are of solid wood, like pieces of a very thick roller; they are cased with cast-iron, and each of them fixed in a separate frame.

This cart is used for manuring pastures, or clover-ley, at a time when those of a common construction would injure the ground, by cutting deep ruts and destroying the turf.

Sowing-troughs, have been tried for turnip-seed, but their utility does not seem well established. They are capable of sowing very regularly, if the seed does not stop in the holes; but it is difficult to make a small hole in which one large seed or two small ones will not sometimes hinder the passage of the rest.

A piece

A piece of wire has been put into the holes of some turnip-drills, which by its motion, may be supposed to hinder the seeds from lodging.

SECT. VII.—THRASHING-MILLS.

MR. PICKERING, of Harrold, has a small machine which cost about 45*l*. The drum beats the corn downwards, which is generally esteemed the worst method, and passes within about half an inch of a fluted plate of iron. It thrashes wheat very well, but only at the rate of five loads in nine hours; and Mr. Pickering says, that in the case of barley, its work demands less praise, as is the case with many others.

The Rev. H. Y. Smithies, of Little Staughton, has a two-horse thrashing-mill, which cost about 60*l*.

The horses walk in the open air, and the shaft passes under the horse-path. The drum has four beaters, without any boards between them, and no inconvenience is experienced from its being open; it turns the corn upwards against a fluted apron, that will lift up when obstructed. This machine thrashes wheat after the rate of eighteen or twenty loads in a day; oats, fifteen or sixteen quarters, and no complaints are made with respect to barley.

Mr. Den, of Tempsford, has a machine which was built by Mr. Nation.

The horses draw by a swivel-tree, which is fixed eight feet and a half from the centre of the beam.

The horse-wheel has 156 teeth, which turns a spar-wheel of thirteen teeth; and by means of two other wheels, the drum is turned at the rate of sixty times every revolution of the horse-wheel. If the horse walks

two

two miles an hour, he will perform 200 revolutions, and the drum 12,000 in an hour. The drum is four feet long, and contains eight beaters, which strike the straw 96,000 times in an hour. The servants think it will take in ten dozen of sheaves per hour, by the use of only one horse; now, as the fluted cylinders which draw in the corn, are at least ten inches in circumference, and as they move one-fourth of the pace of the drum, they will revolve 3000 times in an hour, and draw in 30,000 inches of corn; but if every sheaf be supposed forty inches long, ten dozen will extend a length of 4800 inches, which will permit every sheaf to be divided in the feeding into six parts, though it is probable they never are divided into such small portions. As 32 beaters strike the corn every revolution of the flutes which draw it in, the distance of the strokes will be $\frac{1}{100}$ of an inch; and an ear of wheat two inches and a half long, will receive ten strokes of the beaters on its entrance, besides the slight friction of 150 more, before it has passed the machine.

In this thrashing-mill the upper fluted cylinder is turned by the machinery, and the lower one is fixed in a frame, and is turned only by its pressure against the upper one, with which it is kept in contact by weights, and a kind of lever is provided, by treading on which, the feeding can be regulated at pleasure, or the feeding stopped in an instant, by depressing the lower fluted cylinder.

The shaft that connects the horse-wheel with the body of the machine, is provided with a ratchet-wheel, which permits the drum to continue its motion after the horse-wheel is stopped. This is intended to prevent accidents from the horses stopping too suddenly; but some people think there is little danger from this source.

Lord

Lord Ongley has lately erected a thrashing-machine at Warden; it is worked by two horses, or four oxen, and is much like that before described at Tempsford.

The drum turns the upper fluted cylinder by a strap, which is prevented from slipping off the wheels by a raised edge on opposite sides of the two wheels, as below:



A chaff-cutting machine, made by Mr. M'Dougal, may be also worked with the thrashing-mill.

At Biggleswade, Mr. Brichenno has one of Tunstall's patent machines, which cost 50 guineas. The lower feeding cylinder is here turned by the machinery, but the upper one is turned only by its pressure on the lower one; and as this method is found competent to the purpose, it is useless to describe the machinery that is sometimes employed to turn both the cylinders, and at the same time give the upper one a liberty to rise when obstructed, or fed too profusely.

The drum consists of twelve beaters, one inch deep, in a saw-like form, being only a kind of feather-edged boarding, plated with iron at the fore-part.

Two horses are employed, and the pace of the drum seems to be 100 times as fast as the horse-wheel. It thrashes ten loads of wheat in nine hours, allowing an interval for clearing the machine, and four quarters of barley.

Mr. Brown, at Dunton, has a machine nearly like that of Mr. Brichenno's, but in this the drum has fifteen beaters. It will thrash ten loads of wheat, fifteen of beans, or five quarters of barley, in eight hours; but Mr. Brown remarks, that here and there a bean will be broken;

broken; and that the apron must be set so near the drum in thrashing barley, as to grind many of the corns.

It may here be observed, that increasing the number of beaters from the ordinary quantity of four or six, is here pushed to an extravagant length, insomuch, that they almost cease to deserve the name of beaters; and act merely by friction.

The great utility of making the corn pass over the drum, consists in its tendency to lean against the beaters; but the drum with fifteen beaters is so nearly like a round barrel, that the distance between the beaters allows no time for the re-action of the straw, and offers a remarkable contrast with the open drum of the Rev. Mr. Smithies; though the latter became open rather from accident than design, as some of the boards were broken, or became loose, for the want of being fastened by an iron hoop, to enclose each end of the drum.

Mr. Cowley, of Holcut, has a thrashing-mill, which was made mostly by a common carpenter; it is turned by a slight under-shot water-wheel, which is about twelve feet diameter, and three feet wide. The water has very little fall, and the machine is set to work merely by confining the water to that side of the brook which is occupied by the water-wheel, which is sometimes applied to work Mr. Salmon's chaff-cutter. The thrashing-mill and wheel-work cost about 30 guineas.

Mr. Grant, of Leighton, has a machine which is worked by water, which is conveyed to the top of a wheel 22 feet in diameter, through a wooden pipe with a bore of six inches. The drum of this machine is about four feet four inches long, and twenty inches in diameter; it contains six beaters, and will thrash fif-

TEDS.]

P

teen

teen loads of wheat in a day of ten hours. A pair of stones is also attached to it, for the purpose of grinding beans and barley.

Owing to an insufficiency of water, it was necessary to construct a large reservoir, and the whole expense is said to have amounted to considerably more than 1000*l*.

His Grace the Duke of Bedford has three thrashing-mills at Woburn. The one that was erected at Deadman's-hill farm, appeared (in 1805) to thrash barley about as well as may be expected from a careful *tasker*.

The machine at Speedwell farm thrashes four dozen of sheaves per hour. By a pair of variation-wheels, which I have not seen elsewhere, the feeding rollers may be made to draw in the corn faster or slower, according to its kind and quality. They are turned by a strap, and their shape is here exhibited in a figure.



In a machine of Mr. Runciman's, which was built by Mr. Wigful, the pace is varied by means of a wheel with three concentric rows of teeth.

Mr. Young has given a detailed account of experiments on the thrashing-mill at the Park farm, Woburn, in the 39th vol. of the *Annals*; and as these are perhaps all the experiments of this kind that Bedfordshire has produced, they ought not to be omitted.

“The Duke has erected a very complete thrashing-mill; and, under the same roof, and turned by the same power, a grinding and bolting mill, with every convenience for the manufacture of flour in all its varieties.

“His

“ His Grace had ordered wheat, barley, and oats to be ready, that we might see them thrashed, and examine how well it would perform its work. It thrashed and dressed eight bushels one peck and a half of wheat in fifteen minutes, the horses not being driven harder than when they hold their work all the day of eight hours, besides one peck of tail: rejecting the tail, this is 268 bushels in eight hours.

The expense may be stated thus :

	s.	d.
3 men,	4	6
3 boys,	2	0
4 horses,	8	0
	14	6

“ *Note of its Work at another Time.*

“ The thrashing-machine has been observed to perform as under :

<i>Thrashing and Dressing.</i>	<i>Per Hour.</i>	<i>Day of 7 Hours.</i>
Beans of a bad sort, yielding } little grain,	17 $\frac{1}{4}$ bush.	23 $\frac{1}{2}$ loads.
Wheat,	15 ditto	13 qrs.
Barley, from 10 $\frac{1}{2}$ bushels to } 27 bushels per hour, making } an average,	18 ditto	20 qrs.

“ *Calculation of Earnings at the above Rate.*

“ *Beans.*—Those thrashed as above were very foul, and yielded very bad, some farmers present saying, that though 4d. was no uncommon price, yet those were fully worth 16d. according to which it would stand as follows :

Thrashing and dressing 23 $\frac{1}{2}$ loads, at 16d.	£.1	13	0
Wheat, thrashing 2s. and dressing 6d. 13 } quarters, at 2s. 6d.	1	12	6
Barley, thrashing 1s. 8d. and dressing 6d. } 16 quarters, at 2s. 2d.	1	14	8

"Expense of Working each Day.

	<i>s.</i>	<i>d.</i>
4 horses, at 2s. 6d.	10	0
A lad to drive,	0	9
3 men to feed, and attend the boys, at 1s. 6d.	4	6
2 boys to bring forward the corn, and back the straw, at 6d.	1	0
Interest on the expense of the machine, and for repairs, 10l. per cent. on 365l.		
	18	3

"Memorandum—On the quality of barley, and proportion of the neat grain produced from the corn in straw, which, before being thrashed, was weighed, as was also the neat grain produced.

By Lord Fitzwilliam's machine, $\frac{4\frac{1}{2}}{169}$
Woburn Park farm, $\frac{44}{169}$
Mr. Moody's, $\frac{69}{169}$

*"Woburn Park Farm,
Nov. 17, 1796.*

"EXPERIMENTS WITH THE THRASHING-MILL.

"On the Endless Net.

	<i>Value at 8s. per Bushel.</i>
From cavings that ran through the net in thrashing 25 bushels of wheat, was ob- tained by re-thrashing, in 5 minutes,	£.0 0 3
1 quart,	
Per day, at this rate, would produce 10½ pecks,	1 1 0
In former experiments, the expense of work- ing per day was computed at	1 1 0
<i>"From</i>	

“ From the above it appears, that over what pays for working the machine, nothing is gained by thrashing the cavings from the net ; and when the wear of the mill is considered, as also the general stoppage, and trouble of getting up the cavings, it is doubtful whether it may at all pay the expense. In this case, it appears more advantageous to let the whole go to chaff, and the cattle would then probably reap an advantage equal to one-fourth, or more, of the value of the grain ; and at the same time a small portion might be procured at the bottom of the cavings without expense, and the rest might go to chaff.

“ On the Second Rake.

From cavings produced in thrashing the aforesaid 25 bushels of wheat, was ob- tained by re-thrashing them, in 15 minutes, 6 quarts,	}	£.0 1 6
Per day, at this rate, would produce 21 pecks, 2 2 0		
Cost of working as before,		
Gain, over what pays for working per day, £.1 1 0		

“ From these observations it appears, that the produce of the second rake answers saving, but that the net is of no advantage. If the straw from the second rake was thrown on a very fine inclined grate, and from thence, by its own weight, suffered to run out of the house, it is more than probable, that the small portion alluded to in the remark on the first experiment, would thereby be detained amongst the cavings from the rake, without adding to the quantity of cavings, or labour of re-thrashing ; or, by having a more open grate,

grate, it is most likely that the whole of the cavings that are now saved by the net, would pass through that grate, and might be collected, either separate or together, with those of the rake.

“ Of Men’s Labour compared with Horses thrashing Wheat.

“ Sixteen men began, but not being sufficient to keep up proper motion, the number was increased to 22 men, who, in 25 minutes, thrashed 25 bushels of wheat; but it appeared that 24 would have been requisite to work the whole day.

“ Comparison.

24 men, one day each, at 1s. 4d.	£.1	12	0
5 horses, at 2s.	£.0	10	0
Driver,	0	1	6
		<u>0</u>	<u>11</u>
			6
Advantage of horses over men per day, ...	£.1	0	6

“ To thrash the cavings in the former experiment, only 16 men were employed, and it was proved that 8 were equal to that work, being only one-third of the labour of thrashing wheat; but as the cavings are mostly thrashed immediately after, and with the same number of horses as generally employed at the wheat, no account was taken of that in the computation of the expenses of the preceding experiments.

“ Woburn Park Farm,

June 21, 22, and 23, 1796.

“ Experiments with the mill, and power to work the same with sufficient velocity for performing the various operations,

operations, being two revolutions and a half of the horse-wheel per minute, and estimation of the cost of moving the same, computing 493 lbs. weight (as per experiment No. 1.) equal to the power of three horses, and the value of each horse's labour, at 2*s.* 6*d.* per day of seven hours.

Experiment No. 1.

	Weight and Power required to move and perform the Operation.	Cost of Power per Day compared with Horses.
	<i>lb.</i>	<i>s. d.</i>
Thrashing barley with the whole of the machinery; feeding rollers; rake, net, and fanners at work; feeding at the rate of 5 bundles of 14 lb. each per minute, and producing about 12 bushels per hour, the works being fresh oiled,	493	7 6

Experiment No. 2.

To move the machinery as above without working,	218	3 4
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Experiment No. 3.

To move the thrashing part without the fanners,	112	1 8½
From this experiment, compared with No. 2, may be adduced the power for the fanners alone,	106	1 7½

Experiment No. 4.

To move the thrashing part without the net or fanners,	111	1 8½
--	-----	------

Experiment No. 5.

	Weight and Power re- quired to move and perform the Ope- ration.	Cost of Power per Day com- pared with Horses.	
	lb.	s.	d.
To move the drum alone, without either rollers, rake, net, or fanners,	112	1	8½

Experiment No. 6.

To move the drums with the rollers,	114	1	9
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Experiment No. 7.

To move the drum, rollers, and rake, in the operation of passing straw through the rake alone,	140	2	1½
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Experiment No. 8.

To move the horse-wheel alone,	8½	0	1½
To move the same with the upright shaft,	21	0	4

“ Several of the foregoing experiments were made before the machinery was oiled ; and it appeared, that one half more power was then required to perform the same operations.

“ From the foregoing experiments the following calculation of the proportion of the expense of the respective operations may be collected.

Labour

	<i>s.</i>	<i>d.</i>
Labour to move the horse-wheel per day,	0	1½
Ditto the upright shaft leading to the thrash- ing-machine,	0	2½
Ditto drum and feeding rollers,	1	5
Ditto rake and net,	0	0
Ditto fanners,	1	7
For raking the straw and corn,	0	4½
Thrashing, netting, and fanners,	3	9½
Total cost of working per day, not including men's labour,	7	6

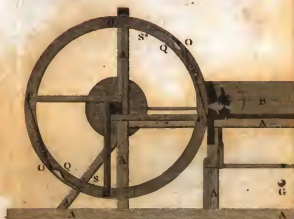
“ Memorandum of grain produced from the net and inclined grate, in order to ascertain the utility of collecting the same, which is expected to be done by another additional rake. From producing eight bushels and a half of wheat was found as follows:

	Wheat got from Experi- ment.		Would be per Day, suppos- ing 100 Bush. thrashed,		Value at 10s. per Bushel, or 2d. per lb.	
	<i>lb.</i>	<i>oz.</i>	<i>lb.</i>	<i>oz.</i>	<i>s.</i>	<i>d.</i>
From under the inclined grate, } by sifting,	0	2	1	7½	0	3
Ditto by thrashing,	1	10	19	2	3	2½
From the bags brought back } by the net, got by sifting, ..	0	11	8	1	1	4
Ditto by thrashing,	0	3	2	3	0	4½
Quantity and value per day of } produce from net and grate, }	—		90	13½	5	1½

“ Computation of the Expense of separating the above, by means of the proposed additional Rake.

	s.	d.	s.	d.
For raking only, per day,	0	4	½	
To which should be added the labour	2	7	½	..
in carrying up, thrashing, and				
fanning, suppose not less than				
Total expense,	3	0		
Probable gain, or earnings per day, to pay }	2	1	¼	**
for making the same, &c.				

The merits of thrashing-machines must be considered as on the whole well established ; at the same time it must be acknowledged, that the best mode of constructing them is known to so few, if indeed to any, that they sometimes disappoint the maker, and perhaps more often the purchaser, who, apprehensive that the reiterated repairs may amount to more than is predicted, sometimes contents himself with the use of the flail. The reason alleged, in the vicinity of Biggleswade, for the erection of thrashing-mills, is the scarcity and consequent carelessness of labourers; yet I am informed, the thrashing-mill belonging to G. Thornton, Esq. at Muggerhanger, is laid aside, because the iron horse-wheel was broken. Another is not in use at Tillbrook; and Mr. Runciman's, of Woburn, has remained a considerable time with a broken drum. A farmer at Eaton Bray remarked, that the ricks of a farm on the borders of Hertfordshire were almost as green as a mea-



Section on the line 1.2.



End Section on the Line 3.4.

PLAN Eleva

dow, from the corn left in the straw by a thrashing-mill. From the whole of the above observations it may be inferred, that the expense of these machines is deemed a serious consideration, and that their first principles demand a mature and experimental investigation.

SECT. VIII.—CHAFF-CUTTERS.

A FEW of these implements, made by Gooch, M'Dougal, &c. are met with in different parts of the county; but that invented by Mr. R. Salmon, of Woburn, is, I believe, the only one in which the straw is stationary at the time it is cut.

The principal part of this invention consists in fixing a ratchet-wheel on the end of the rollers which draw in the straw, which having a great number of teeth, is capable of moving the straw forward at each stroke of the knives, so as to cut it at any length which is required.

Mr. Young characterizes this chaff-cutter as the best that he had seen, and has given a plate and description of it in the 39th volume of the Annals, which is here copied.

“References to Plan, Elevations, and Section of the Chaff-cutter, invented by Mr. R. Salmon, of Woburn.

“A, wood frame for wheel and chaff-box.

“B, chaff-box.

“C, rollers with iron teeth.

“D, ratchet-wheel on the end of the roller-spindle,
one

one of which is fixed to the roller on contrary sides of the box.

“ E, presser to hold down straw.

“ F, an iron plate on each side of the box, hanging on a pin in the presser and on the top roller, and being conducted by a staple, confines both presser and roller to rise and fall uniformly together, more or less, according to the body of the straw in the box.

“ G, pressing weight moveable on a lever, connected with the plates hanging on the top roller and presser; by shifting of which weight, the straw is more or less pressed, as may be required.

“ H, cutting wheel, turned either by the handle *a*, or by a rope or chain on the rigger *b*.

“ I, a block of wood fixed on the extremity of the axis of the cutting wheel; in this block are four holes at different distances from the centre.

“ K, horizontal arms to be connected with the block I, by a screw pin *c*, applicable to either of the four holes, as may be required, in order to give the horizontal arm more or less motion.

“ L, cross bar, moveable on a pin at the centre of the box, and connected to the horizontal arm K, by a pin applicable to either of the four holes at the end of the cross bar.

“ M, small arms fixed to a bracket, and connected to the cross bar L, by an iron pin; the ends of these arms are made one to pull, and the other to push the ratchet D, and turn the rollers, whereby the straw is carried forward, more or less, in proportion to the extent of the motion of the cross bar E; which motion is regulated by the holes therein, and those in the block I, susceptible of twenty changes; consequently, twenty different

different lengths of chaff may be cut, if requisite. These small arms are kept to their bearing on the ratchet by a string fastened to the lower arm, going through a hole and round a peg on the upper arm.

“ N, case, moveable at pleasure, to cover the cutting-wheel, and prevent accidents from the knives.

“ O, knives, of which there are two, lying at an angle of about 45 degrees, on the circumference of the wheel.

“ P, iron bearers, to which the knives are fixed by a thumb-screw; these bearers hang on a screw at the end P, and by means of the spring Q, are forced forward, so as to give them a sufficient bearing against the box.

“ R, a wedge, moveable at pleasure, so as to prevent the knife from coming more forward than is requisite, and as the knife wears away, to adjust them to their work.

“ S, a wooden peg, round which a string is continued from the end of the spring, so as to give the spring as much force as is just necessary to cut the straw clean.

“ From the construction of this chaff-cutter, it will be found to have the following properties: any length of straw may be cut; the straw is quite stationary during the cut, and no more friction against the box than is necessary to cut clean; and the knife maintains, in all parts, a uniform velocity, and presses with the same inclination and angle throughout the cut.

“ *Expe-*

“ Experiment on Chaff, May 13, 1795.

Straw,	499lb.
Hay,	395
Total,	<u>894lb.</u>

Quantity of chaff, 137 bushels.

Weight per bushel, six pounds and a half.

Price of straw, 4 cwt. 2 qrs. at 1s. 10d.	£.0	8	3
Ditto hay, 3 cwt. 2 qrs. at 4s.	0	14	0
Cutting 137 bushels of chaff, at 12d. per } score, by hand,	0	7	0
	<u>£.1</u>	<u>9</u>	<u>3</u>

“ Kept ten beasts three days and a half, at 10d. per beast per day.

“ The same weight of hay would have been worth 32s. and the beasts would have cost 11d. per day.

“ Experiments in cutting Chaff with Water Wheel and one Man.

“ Six bushels, shortest length, in 24 minutes, being 15 bushels in an hour, or 150 in ten hours.

“ Repeated, 17½ in an hour.

“ Fifteen bushels in 20 minutes, the next length, being 45 bushels in an hour.

“ Ten bushels in 10 minutes, the next length, being 60 bushels in an hour.

“ Twenty bushels in ten minutes, the longest, being 120 bushels in an hour.”

SECT. IX.—WINNOWER MACHINES,

By Gooch, Salmon, &c. are in use in various places, and they are acknowledged to be essentially useful, no other mode being found capable of cleaning of corn to an equal degree of perfection.

SECT. X.—WEIGHING ENGINES.

MR. SALMON, of Woburn, invented a mode of applying a spiral wheel to those machines, by means of which the various weights are shewn by an index, in the manner of a clock. The spiral in this application answers the purpose of the steel-yards, without being attended with any trouble, as its revolution has the effect of removing the pressure of the weights, &c. farther from, or nearer towards, the centre. The weighing machine is indispensable in the comparison of the breeds of cattle, and furnishes the only means of ascertaining the intrinsic value of the various kinds of cattle food.

The prices of some of the principal implements before-mentioned, which are made by Mr. Shepherd, of Woburn, were stated in 1803 as follows :

	£.	s.	d.
Thrashing machines, fixed complete, }	100	0	0
from 60 <i>l.</i> to			
Patent weighing machines, for the use of }	105	0	0
turnpike roads, &c. from 90 <i>l.</i> to			
The same with an index, &c.	120	0	0
Small ditto to stand in a room, for gentle- }	25	0	0
men to weigh themselves,			

Smaller

	£.	s.	d.
Smaller ditto, to weigh meat,	15	0	0
Portable machines for weighing oxen, &c. } 25 <i>l.</i> to	30	0	0
Salmon's drilling machines for 5 furrows, } &c. 12 <i>l.</i> to	18	0	0
New-invented straw-cutter,	13	13	0
Under-ground draining, or mole ploughs,	3	10	0
Bruising rollers for oats, beans, malt, &c. } 10 <i>l.</i> to	25	0	0
Winnowing machines, 5 <i>l.</i> 5 <i>s.</i> to	10	10	0

CHAP. VI.

ENCLOSING.

SECT. I.—CASES BY ACT OF PARLIAMENT, &c.

IN the original Report it was supposed that three-fourths of the county; or 217,200 acres, were at that time in the state “of open or common fields, common meadows, commons and waste lands.” Into the accuracy of this estimate it is not necessary at present to inquire: it will be seen, however, that the business of enclosing has made much progress since the period referred to, as about fifty enclosures have taken place within the last thirteen years.

In the following tabular view of the enclosures, the names of the parishes are placed alphabetically; the date of the enclosure follows in the next column; the third distinguishes by the letter *t*, such as remain subject to tithes; and in the fourth column the number of acres in the parish is inserted, so far as I have been able to obtain any information on that subject, which cannot be supposed to arrive at much exactness in all cases. In the last column the initials *c, g, s, l, w, ch* are used to denote the predominant soil, as clay, gravel, sand, loam, wood-land, or chalk. The soil which constitutes the greatest part of the parish, is denoted by the first of the letters, though great accuracy cannot be expected in such cases.

Tabular View of Enclosures.

Parishes.	Date.	Tithe.	Acres.	Soils.
Aspley,	1759	—	—	s. c.
Astwick,	new.	—	—	c. g.
Arlsey,	1804	—	—	g. c.
Ampthill,	1807	—	—	s. c.
Bedford,	new.	—	—	g. l. c.
Blunham,	1796	—	3010	g. c.
Bletsoe,	old.	t.	—	c. g. l.
Barford (L.),	1778	—	—	c. g.
Bolnhurst,	1778	—	2500	c.
Bromham,	old.	t.	—	c. g.
Battlesden,	old.	—	—	c.
Campton,	1797	—	—	{ s. l. c.
cum Shefford,				{ s. l.
Carlton,	1805	—	—	c. g.
Chillington,	1805	—	500	c.
Cockayne-Hatley,	old.	—	—	c.
Cardington,	1802	t.	3000	g. c.
Chalgrave,	1797	—	1780	c.
Hockliffe,	—	—	—	c.
Cople,	new.	—	3000	g. c.
Chicksands,	—	—	—	s.
Dean,	new.	—	—	c.
Dunton,	1797	—	2200	c.
Eaton Socon,	1795	—	9000	c. g.
Edworth,	—	—	—	c.
Everton,	new.	—	—	s. c.
Eversholt,	1807	t.	—	s. c. w.
Elstow,	1797	—	1060	g. c.
Eyworth,	—	—	—	c.
Farndish,	1800	—	672	c.
Felmersham,	1765	—	2290	c. l.
Flitwick,	1807	—	2130	s.
Harrold,	1797	—	3300	c.
Henlow,	1795	—	2000	c. g.
Holwell,	1802	—	—	c.
Hulcot,	old.	—	—	c. g.
Houghton (R.),	1796	—	4000	c. ch.
Houghton (C.),	1807	t.	—	c. w.
H. Crawley,	1795	—	1610	s. c.
Kempston,	1802	—	—	c. g.
Keysoe,	1803	—	—	c. g.

Parishes.

Parishes.	Date.	Tithe.	Acres.	Soils.
Knotting,	old.	t.	1700	c.
Lidlington,	1775	—	2500	c. s.
Marston,	1796	t.	4000	c. w.
Maulden,	1796	—	2560	s. c.
Millbrooke,	1795	—	—	s. c.
Milton (B.),	1793	—	1545	c. l.
Milton Ernest,	1803	—	1350	g. l. c.
Northill,	1796	—	5000	c. w. g.
Oakley,	1803	—	1700	g. c.
Odell,	1776	—	2846	c.
Pavenham,	1769	—	—	c. l.
Perten-hall,	1796	—	850	c. g.
Potton,	1774	—	—	s. c.
Postgrave,	old.	t.	—	c.
Pullox-hill,	old.	—	—	—
Puddington,	1767	—	3000	c. w.
Ridgmount,	1796	—	—	c. s.
Risely,	1793	—	3100	c.
Stondon,	—	t.	—	c.
Sandy,	1798	—	3000	s. c. l.
Salford,	1807	—	—	—
Shelton,	1794	—	1000	c.
Shidlington,	1802	—	—	c. ch.
Souldrop,	1770	—	—	c. w.
Southill,	1797	—	2600	s. g. c.
Stevington,	1805	—	1400	c.
Staughton (L.),	1801	—	—	c. g.
Sundon,	1768	—	—	l. ch. c.
Sutton,	1742	—	—	s. c.
Tempsford,	1777	—	2400	c. w. g.
Thurleigh,	1805	—	4000	c.
Turvey,	—	t.	3180	c. g.
Tillbrook,	1800	—	1380	c. g.
Tilsworth,	1767	—	—	c.
Tingrith,	1765	t.	933	s.
Toddington,	1797	—	5437	c. g.
Whipsnade, part of,	1798	—	—	g. ch. l.
Willington,	new.	—	1700	g.
Wrestlingworth,	1801	—	1860	c. l.
Woburn,	old.	—	—	s.
Warden,	old.	—	—	s. c.

In the 42d vol. of the *Annals*, Mr. Young has given so ample a collection of minutes, concerning parliamentary enclosures in this county, that it was deemed proper to add them to this Work.

These minutes were taken in most of the parishes where the soil is of a convertible nature, and are in general so much in coincidence with the observations that have been since made, that, excepting some alterations in the plan, and some abridgment of their contents, they are mostly in the words of their indefatigable Author.

The observations on the various enclosures could not be made more complete, on account of the difficulty of obtaining correct information.

The parishes which Mr. Young has visited, will be distinguished by his initials, *A. Y.* and most of the additional remarks will be followed by the letter *B.*

Aspley Guise. A. Y.

Quantity enclosed, 1053 acres.

Rent.—The commissioners' valuation of it 501*l.* 5*s.* 8*d.* The present rated rent for the whole parish 1673*l.* 10*s.* paid by forty-eight proprietors.

Course—At present on the sand:

1. Turnips,
2. Barley, produce 4 qrs.,
3. Clover, bents, and trefoil,
4. Ditto,
5. Wheat, twenty-five bushels,
6. Barley, oats, pease, or rye.

On the clay, open-field course, the produce of which is estimated at five loads of wheat or beans.

Sheep.

Sheep.—About 300 kept now in the parish.

Poor.—There were only four cow commons left at the time of enclosing, the rights having been alienated from the cottages. At present there are nineteen persons who pay rates for closes.

Expenses.—These will appear curious, to those who know the present ones upon enclosing :

Surveying 1206 acres, at 1s. 2½d.	£. 72	9	0
Map,	84	0	0
Five Commissioners, at 10s. a day,	105	0	0
Act,	324	15	9
Inn, the Commissioners' expenses,	55	6	2
Rector's fence,	46	3	6
Clerk,	23	2	0
Labour and petty charges,	65	1	7
Being about 15s. per acre,	£. 775	18	0

This parish contains a marl pit for the common use of the farmers. *B.*

Amphill.

The Rector has an allotment for the tithe of the warren, and a corn rent for the old enclosures.

The substratum of the warren at the west end of the town, is a loose white sand of considerable depth.

“ A survey of Amphill-park, taken by order of the parliament in 1653, describes 287 trees as being hollow, and too much decayed for the use of the navy.

“ These oaks thus saved from the axe by the commissioners' report, remain to the present day, and by

q 3

their

their picturesque appearance, contribute much to the ornament of the place*."

Bedford.

One-sixth of the arable, and one-ninth of the sward, home-stalls, &c. were given in lieu of the tithes after the roads were set out. Allotment to the Lord of the Manor, one-twentieth of common, or unknown property.

Guardians, &c. not allowed to borrow more than 3*l.* per acre to pay the expense of enclosing.

Commissioners two guineas per day; paying their own expenses.

Blunham and Muggerhanger. A. Y.

The old course was 1. fallow, 2. wheat, 3. beans, oats, &c. and is changed on the drier soils to 1. turnips, 2. barley, 3. clover, &c. for one or two years. White clover has lately been substituted for red.—(B). 4. Wheat.

Pease have been drilled in this parish with a borrowed machine; but enterprise and prejudice seem pretty regularly matched in this part of the gravelly district.—B.

Blotsoe.

A very old enclosure.

Bolnhurst. A. Y.

I did not go to this parish; but the account I heard of it from a practical and enlightened farmer,

* Mr. Lysons' *Magna Britannica*.

within six miles, was this; that it was a wet, heavy, bad country, very disadvantageously circumstanced respecting roads; for every way around they are almost impassable. That the arrangement after enclosing, fell into bad hands; they laid much down to grass in as bad order as possible, and it is continued so ever since, in as rough and ill conditioned and unprofitable a state as can well be conceived; though there are a few farmers in it that do tolerably. From this account it should seem, that corn has there been lessened, without making amends for the loss by ample products of new grass. A gentleman in the north of the county, writes of this parish as follows: "the inhabitants assert that here is the worst soil on this side of the county; descend which way you will, the soil improves in some measure. The soil is a white hard clay, the substratum often blue golt, and is proverbially bad. The inhabitants of Bolnhurst are unfortunately situated thus: three speculating gentlemen purchased the greatest quantity of land they were able, in the parish, with an intention of enclosing it, and selling the estates afterwards to a great advantage. Here they were deceived, the land was bought, and the parish enclosed, but when offered for sale, no one would advance near the sum required, and so they remain. The proprietors wish to sell, and lett their land only from year to year, and have done so ever since the enclosure. Their grass land is totally neglected, but the arable they must manure, or they could have no crops. What they have is good, and the quantity in proportion to the manure bestowed. If one asks the tenant, "why do you not improve the land?" their remark is commonly thus: "whatever expense I am at may be all lost next year, when I must

quit if the land is sold, having no lease for that very purpose."

As the tenants of three principal proprietors are thus situated, very few will blame them for their backwardness in improvements.

The land is certainly not very good, but not so bad as many suppose or believe. The late Vicar took the land into his own hands: part of the grass had not been mown, I believe, in the memory of man, and it was a common expression, that a rat might be whipt over it at any time of the year without being lost; but this gentleman so managed it, that it cut as much hay as any in the parish; and it is presumed, the rest of the parish is capable of much improvement.

Bromham and Battlesden,

Are both old enclosures. They contain a considerable portion of ancient pasture.

Campton cum Shefford. A. Y.

Here was a rich common of seventy acres. Many cottagers kept cows before, and managed them as they could in winter: a few sold them before winter; others bought food; allotments were made in lieu to the landlords of those tenements, in general three roods for a right; but these were thrown with the rest, and the poor, as usual, in so many other cases, left without either stock or land, except in the case of two owners, one of whom sold his allotment for forty guineas; the other keeps it.

Previous to the enclosure, the common rights consisted of a mare and colt, or a milking cow, two bullocks, and twelve sheep. A person of Liddington, who used to send bullocks to Campton common about
the

the year 1768, paid but 5*s.* 2*d.* a piece for twenty weeks' keep, and he observed that they would almost get fat, even when very little grass was to be seen.—*B.*

Carleton, Chellington, and Stevington,

Were all enclosed by one act of parliament.

Tithe allotment, one-fifth of the arable, one-eighth of the hay-grounds, one-tenth of the woods, and one-ninth of all other ground.

Lord of the Manor, one-twentieth of wastes and commons.

Cardington.

Lands divided without an act of parliament, but much of it not fenced. Such was also the case at Cople and Willington.

Dunton. A. Y.

Quantity.—Two thousand two hundred acres.

Expenses:—

Law,	£. 584
Survey,	403
Commissioners,	357
Roads, drains, &c.	459
	£. 1803

Soil.—Clay.

Rent.—Before, about 8*s.*; quality 17*s.*

Course.—Five fields; two fallow, three cropped.

Tithe.—One-fifth and one-ninth.

There

There is a new farm in this parish, consisting of 500 acres, belonging to Earl Spencer.

Eaton Socon. A. Y.

Quantity.—Enclosed by the act above, 6000 acres.

Poor's-rates.—Two years before the enclosure, 4s. 6d. in the pound; 1799, 5s.; on the new rental of the commissioners' valuation, 1950l. for poor at 5s. ending Easter 1800.

Course.—Before, 1. fallow, 2. wheat or barley, 3. beans or barley, through all soils: by poor farmers oats. Now, many in the common open-field course.

On the light soils, 1. turnips, 2. barley, 3. clover, 4. Wheat, and sometimes barley after clover, on one earth instead of wheat. Mr. Walker seeded the clover and then barley on one earth, and never a finer crop. I viewed a field of Mr. Hall's, in the same management, and there can hardly be a finer crop; to appearance, seven or eight quarters per acre.

Several farmers have had wheat after beans, and have succeeded well; and have now as good wheat on bean stubbles, as any in the county.

Mr. Walker thinks they do better than on fallow; as, 1. fallow, 2. wheat, 3. red clover, 4. beans, 5. wheat.

Another variation is: 1. turnips, 2. barley, 3. winter tares fed by sheep, sometimes soiled, and also made into hay; 4. left till wheat seed-time, and sown with that crop; and Mr. W. has now thirty acres thus managed, clean and good: it is a kind of husbandry calculated to destroy weeds.

Produce.—Before, on three rood-acres, tithe gathered,

thered, wheat, fifteen bushels, on an average; barley 24; beans, 20; oats, 16 to 20 bushels.

Now, on the statute acre, they expect 25 bushels of wheat; barley, five quarters; oats, very few yet; beans, 25 bushels. Their turnips are very good; clover and tares no better to be seen.

Rent.—From 10*s.* to 12*s.* for three roods, some 6*s.* and 8*s.*; now, arable on an average 16*s.*; and arable and grass together, 20*s.*

Laying down.—None at present permanently, but expect that much will be laid, but it will be better to cultivate for some years first.

Before the enclosure, a great deal of old pasture was constantly mowed; now, that is turned to pasturage by means of mowing clover and tares, which yield four times as much: and this proves a great advantage to those grounds. Mr. Walker and his father took the tithes, and that of mown pasture was scarcely worth the carriage: would lett it for any thing, even 1*s.* per acre, it was so impoverished by constant mowing.

Farms.—A few of 30, 40, and 50 acres; but in general from 200 to 500, of which last is Mr. Walker's.

Sheep.—Some of the little farmers had none; and it is doubtful whether their numbers are increased or lessened. As to carcass, the value is more than doubled: they were kept only for folding; now, the New Leicester, and improvement advancing rapidly. The weight of wool has been doubled; as from ten or twelve to a tod, to five or six.

Cows.

Cows.—The farmers never kept more than for their own use: they do the same now; but the cottagers' cows are lessened; they have, however, allotments in lieu; an acre on an average, worth 25*l.* or 30*l.*: some kept them: there may be 20 of these cottage proprietors. Many of those who had rights kept no cows: they would have lett them, but not worth hiring, there being no common worth mentioning.

The persons who were most injured, were higglers, who kept horses, and turned without any right on the commons; but on the whole, the measure has been very beneficial to every party. The land produces more corn; the farmers are coming into better circumstances; the rent is raised; the poor are better employed; every thing advancing; and an emulation raised which must be good.

Eversholt.

The greatest part of this parish was enclosed by private agreement, but is now finally settled by act of parliament. It remains subject to tithes.

Wood 260 acres; cart-horses 38; cows (dairy) 160; breeding sheep 200, which are Westerns, South Downs, and Leicesters; stores and fatting sheep 100; hogs of all sorts 120. *Dr. C.*—Lace-makers and straw-plaiters, about 100.

Felmersham.

Cottages.—33 at the enclosure, previous to which each cottage right was two cows and a breeder, and ten sheep. It is presumed that the population of this parish has decreased, as four or five houses have fallen down in the memory of people in that parish, and none have been built. The number of farmers has
decreased;

decreased; labour is scarce, and insufficient for the employment of the inhabitants, which has induced some of the men to make lace with the women.

The value of the lands at the enclosure was about 636*l*.

Five Commissioners were employed, and allowed a guinea each per day.

The common contained about 150 acres.

One-seventh of the parish was given in lieu of tithes.

The Lord of the Manor was exonerated from keeping a bull and a boar for the use of the parish.

Among the expenses at that early period, are the following items: fencing twenty-six acres and a half, at 40*s*. per acre; fencing five acres of meadow ground, at 1*l*. 10*s*. per acre; ditching five acres, at 5*s*. per acre; single fencing (of quicksets?) 1*l*. per acre.

Every expense attending the enclosure amounted to 1303*l*. Guardians not allowed to borrow more than 40*s*. per acre, to defray the expense of enclosing.

The poor's-rate in the year 1754, at 12*d*. in the pound, came to 24*l*. 11*s*. by which the rent appears to have been 491*l*.

The hamlet of Radwell pays one-half to the Church, and three-sevenths to the poor. Its share of the rate was in 1759, 11*l*. 16*s*. 10½*d*.

The poor's-rate of Felmersham, without Radwill, is now 47*l*. 4*s*.

Flitwick.

Tithe Allotment.—One-fifth and one-ninth of the new enclosures, and a corn-rent for the old enclosures.

An allotment of peat was set a-part for fuel for the poor, as is the case in several other parishes of the sandy district.

Before

		<i>Acres</i>
Before the enclosure.	Enclosed arable,	369
	Enclosed pasture,	680
	Open arable,	620
	Open pasture,	470
	Total,	2130

Harrold.

One-fifth of the arable, or which had been arable within ten years previous to the enclosure, was here given in lieu of tithe, together with one-ninth of the sward and commons, and one-tenth of the woods and spinnies.

Lord of the Manor—one-twentieth of the waste lands.

Allowance to Commissioners—two guineas per day, paying their own expenses. This has been practised also in several other modern enclosures in this county. Clover is successfully grown in this parish, and some boggy ground has been drained at a considerable expense by Mr. Pickering.

Henlow.

On the enclosure of this parish 40 acres were set a-part as a common, and stinted at two cows to a cottage. A gentleman of Biggleswade, who has a common-right at Henlow, remarked as an instance of vulgar prejudice: "There is now (Nov. 14) much grass on the allotted common, but the cottagers will not permit a sheep to touch it, from an opinion that sheep spoil sward." The turnip and clover courses have been successfully adopted in this parish and neighbourhood. The labourers are however of a different opinion; some of them complained that corn was much diminished, and twitch-grass as much increased by the introduction.

introduction of clover, and the disuse of naked fallows. As a proof of this opinion it was alleged, that no additional labourers from Northamptonshire, &c. were now necessary to harvest the corn, which was formerly the case in all this part of the county.

Holcut.

From this and a few other parishes, some statistic accounts were obtained by the Rev. Dr. Cartwright.

This parish is supposed to have been enclosed 200 years. Arable 77 acres, pasture 808.

Horses 10, cows 170, calves fatted 20.

Sheep, 80 Leicesters, 80 Westerns; lambs fatted 150.

Hogs mostly of the Berkshire breed; about 150 fattened with milk. Wood, 35 acres.

No poor have houses in this parish.

Houghton Conquest.

The parish remains subject to tithes, and six or seven farms are lost.

Husborn Crawley.

Of this parish, containing 1610 acres, there are 43 arable; beside the Duke of Bedford's.

Sheep of all kinds about 90, cows 60 or 70, hogs 50 or 60, horses 36.

Lace-makers 122, straw-plaiters three.—*Dr. C.*

Knotting.

Arable 350, pasture 950; wood 400 acres; stores and fattening cattle 100, dairy cows 40; fat calves 20, breeding calves 10; breeding sheep of the New Leicester kind, 500; stores and fattening sheep 600; hogs

50 of the spotted Berkshire kind. About twenty acres of turnips or cole per annum.—*Dr. C.*

Lidlington. A. Y.

In this parish 1415 acres were enclosed by the act. The old enclosures amounted to 1085 acres.

The common, of which the soil is clay, contained 247 acres, and 250 acres of sand were in an open field state.

Course before enclosing, on clay: 1. fallow; 2. wheat or barley; wheat sixteen bushels to an acre of three roods; the barley 24.

Course on sand: 1. turnips; 2. barley, 24 bushels; 3. pease. And, 1. fallow; 2. wheat; produce fourteen bushels;—3. pease, or oats, 22 bushels.

Course since, on clay: 1. fallow; 2. barley; 3. red clover; 4. wheat; 5. beans. A better produce where clover is sown than before; but the old open-field course is sometimes followed on the clays.

About half the clay arable was converted to pasture principally by Mr. Platt; it is fed with cows for the dairy, &c. and some sheep, and was laid down with white clover, a little red, and one bushel of ray-grass.

It has made good pasture; the soil is a clay, but does not want draining, as it rarely poaches; it lies on the old broad ridges.

Rent—Before the enclosure, was 9*s.* an acre average, three rood measure. It is now 22*s.* on a medium, tithe free, but paid tithe before. Average addition of rent 10*s.*

Tithe.—Land given for tithes to Lord Ossory, one-sixth of the arable; one-ninth of the grass and common.

Farms

Farms and cottages the same as before.

The cottagers who proved a right of common, had three acres assigned in lieu on an average value of the field, then about 14s. the statute acre, or equal to 2l. 2s. per annum. Some of them are now lett at 4l. 4s.

Sheep.—Before the enclosure; one farmer, who occupied the Park, that is, a sandy tract of heath, kept 500 sheep; he fed the common in safe times; others, who had only the common, suffered much by the rot. The rest kept among them 8 or 900 more; in all, 1350. Now, Mr. Platt keeps 750, and there are perhaps as many more in the parish; but of a different kind, and far more valuable than before the enclosure.

Mr. Platt's 750 far more valuable than all in the parish before. They were 12 to the tod, or about 110 tods in all: now, nearly 200 tods, and in general better.

The sheep were, before the enclosure, a sort of bastard Wiltshire. The fold was the principal object, and therefore the number of fatted sheep was inconsiderable.

Cows.—Before, not more than 110 (always excepting Brogborough farm; which was enclosed before, and therefore comes not into this account); now, 210.

Poor's-rates.—For about seven years after the enclosure, they were about 1s. in the pound: now they are 4s. on an average of three years, including a trifle for constable's-rate. From 1785 to 1790, six years, they were 2s. 3d. in the pound; in 1796, 2s. 9d.; in 1797, 4s.; in 1798, 3s. 6d.; in 1799, 3s. 6d. In the year ending at Easter, 1800, 4s. 6d. in the pound.

Labour.—The employment for women and children is lace-making, and some earn 5*s.* or 6*s.* a week, if not taken off by the family.

I am informed, that some of the sands were deemed too poor to bear turnips, and were sown with oats or rye after a summer-fallow, and often bore but a single crop in three years. The sheep-fold from the common was the great support of the sands, and much loss was sustained for many years, by the want of this manure after the enclosure.—*B.*

Mr. Platt, of Liddington, who has acted as Commissioner in many enclosures, states the average expense, including fences, at about five years' rent improved value.

Marston. A. Y.

Quantity.—In the whole parish, near 4000 acres. New enclosures, 1999; of which 1550 arable, and 450 grass.

Rent.—Before, 6*s.* to 10*s.*; about 10*s.* the statute acre. The quality price, 1832*l.* for 2000 acres.

Tithe.—Could not agree for it, therefore remains subject. Pay 3*s.* to 4*s.* per acre.

A great portion of the arable was laid to grass, and is likely to make good pasture.—*B.*

Sheep.—About 1000 kept before the enclosure, and half starved; now, the New Leicester for fattening, &c. Cattle are also greatly increased, at the expense—as is generally the case—of some of the best corn land in the county.—*B.*

Expenses.

Expenses.—

Law,	£.400
Commissioners,	422
Survey,	409
Clerk, award, &c.	288
Sundries,	37
Roads,	729
Total,	<u>£.2285</u>

The grass in this parish consisted of meadows, which were mown every year.

Maulden. A. Y.

The common was very extensive. I conversed with a farmer, and several cottagers. One of them said, enclosing would ruin England; it was worse than ten wars. Why, my friend, what have you lost by it? *I kept four cows before the parish was enclosed, and now I don't keep so much as a goose; and you ask me what I lose by it!* Their accounts of advantages, especially when they are gone, are not to be credited.—*A. Y.*

There was much rioting at this enclosure, and soldiers were sent for to quell it from Coventry.

An extensive allotment was set a-part for fuel for the poor, under the direction of the minister and the parish officers.

A corn rent is paid to the Rector by the Duke of Bedford, for the allotment which was set a-part in lieu of the great tithes, and which produces the Rector nearly 300*l.* per annum.—*B.*

Millbrook. A. Y.

The complaints of the poor chiefly turned on the points of fuel: they got much fern and turf; now, an allotment assigned in lieu of the latter.—Y.

This allotment of peat consists of eight acres, and is under the care of the Rector, churchwardens and overseers, for the use of the poor.—B.

The whole expense of this enclosure amounted to 302*l.*; of which, for the Act, &c. about 593*l.*

The warren, &c. contained 878 acres, much of which was qualited at 9*s.* to 10*s.* per acre.

Public fencing, two guineas per chain; gates, two guineas each; stiles, 12*s.*

The title is paid to the Rector by the Earl of Upper Ossory, as a corn-rent on certain lands set a-part for that purpose. The corn rent was fixed with reference to the average price of wheat per bushel, for the 21 years preceeding the enclosure, which was found to be 5*s.* 5½*d.* At the end of 14 years, another average is to be taken, which, if it varies from the former to the amount of 3*d.* in the bushel, the corn rent is to be varied in a similar proportion.

Parcnham.

The total expense of this enclosure is stated to have been 1062*l.*

Puddington.

The following is extracted from Mr. Cooper's account of that parish. "About 1620 sheep kept in the parish. There is a considerable quantity of oak and ash timber. Several beech trees have been lately planted, but they do not thrive in this soil.

"The country, for some miles, may be denominated hilly;

hilly; yet all the hills are gentle regular ascents, the tops of which are clay or woodland, with clay under a shallow staple. The lands are firm and fertile about the town; barren at a distance, with some boggy land in the vallies. There is a considerable pit of sandy gravel, and several stone pits excellent for building.

"In many of the pits are stones, which seem to consist almost wholly of very small shells.

"A spring between Hinwick and Puddington has something of a petrifying quality. The clay or dirt removed in clearing this spring-head has been, when exposed to the air, concreted, rough, and white, something like petrified moss.

Ridgmount.

Two-thirds of the parish are under the plough.

Wood, 180 acres; dairy cows, 90; sheep, 320 (these are not true Leicesters, but a long-woolled sort of sheep); fat lambs, 190; draught horses, 28; South Downs, 100; Westerns, 30.

To this must be added the account of Brogborough, which is part of this parish.

Arable, 180; pasture, 550; wood, 9; cows, 90; sheep, 140; fat lambs, 100; cart-horses, 12.

The tithes of Ridgmount are paid to the Vicar by His Grace the Duke of Bedford,—*Dr. C.*

Milton Bryan. A. Y.

Tithe —The corn-rent is paid by the landlord, 185*l.* a year; and the glebe is worth more than 15*l.*

119 acres of woods in this parish were always tithe free.

Rent.—Before, 8*s.* on an average for three roods
R 3
tithable;

tithable; now, 20s. statute acre, tithe free by a corn rent.

Soil.—Strong land, but some a good loam: nearly three-fourths of the parish is under the plough, as before the enclosure.

Rates.—Poor's-rates were 2s. to 2s. 6d. in the pound; now, all parochial payments whatever 4s. on the present rents. There have been built since the enclosure several new cottages, and in the last ten years, fifteen.

Expenses.—The expenses of the enclosure, including parliamentary fees, solicitor's bill, commissioners, surveyors, roads, but not fences, except 33 acres of poor's land, was in the whole 1600*l*. or 25s. 4d. per acre.

The poor's land mentioned in the preceding article, was 33 acres under a feoffment; it is lett, and has been applied to repairing the church.

Calculation of Produce before Enclosing.

Arable, three-fourths of 1120 acres, 840 of which	} <i>Bushels.</i> 6510
one-third wheat, or 280 acres, at 17½ bushels	
to 3 roods, or 23¼ to statute measure, are	
280 acres of beans, at 20 bushels statute acre,	5600

Since Enclosing.

One-fifth of 1120 acres of wheat, 224, at 22½bnsh.	5040
One-fifth beans, 224, at 25 bushels,	5600
One-fifth oats, 224 acres, at 33 bushels,	7392

Loss of sheep, 630; ditto cows, 7.

Tenantry now depend considerably on profit from
cattle

cattle and sheep ; before the enclosure, that was a losing concern.

Risely. A. Y.

Quantity.—2000 acres enclosed by the Act.

Soil.—Clay.

Course.—Three fields. Now, after two crops, laid to seeds two years.

Rent.—Before, 7s. ; now, 18s.

Tithe.—One-fifth and one-ninth, and one-twelfth for woods.

There is certainly more corn than before. Sheep are fewer in number, but more valuable.

Advantage—Equal, certainly, to the apparent difference in rent, effected by contiguity, drainage, and other circumstances noted elsewhere.—*A. Y.*

Total expense of the Act and the Commissioners, was 3012*l.*

Sheep, about 900 Leicesters ; dairy cows, 100 ; for breeding and suckling ditto, 50 ; draught horses, about 40 ; arable, 1500 acres ; sward, 1500 acres ; wood, 100 acres ; lace-makers, 550.—*Dr. C.*

Stondon,

Is nearly all enclosed ; and the farmer who has most of the parish in his possession, seems to retain a partiality for the old open-field course, and sows clover only occasionally, as once in six or nine years.

Sandy. A. Y.

This parish was very peculiarly circumstanced; it abounds with gardeners, many cultivating their little freeholds, so that on the enclosure, there were found to be 63 proprietors, though nine-tenths, perhaps, of the whole belonged to Sir P. Monoux and Mr. Pym.

These men kept cows on the boggy common, and cut fern for litter on the warren, by which means they were enabled to raise manure for their gardens, besides fuel in plenty: the small allotment of an acre and an half, however good the land, has been no compensation for what they were deprived of.

They complain heavily, and know not how they will now manage to raise manure. This was no reason to preserve the deserts in their old state, but an ample one for giving a full compensation.

Above 1000 acres of warren are here allotted, and ring-fenced. The chief object which makes this enclosure interesting, are the attempts that have been made to cultivate this warren.—Y.

The hilly sands of Bedfordshire have, in this and some other instances, intimidated even the opulent proprietor; and plantations of fir, larch, &c. seem to be considered as the most profitable.

Shelton,

Quantity.—About 1000 acres.

Expenses.—About 22s. or 23s. per acre.

Tithe.—A corn rent; every man distinct.

The soil is mostly clay, and corn is increased.

Souldrop.

There was a *wold* in this parish, containing, perhaps,

haps, 80 acres ; and if pastures covered with ant-hills, and variegated with bushes, furze, and the coarsest sedge-grasses, deserve the name of a *wold*, here are some remains of it to the present time.

Little Staughton.

In this parish, the Rev. H. Y. Smithies has introduced the drill husbandry of Suffolk on his tithe allotment.

Turvey.

Arable, 1700 acres ; pasture, 1500 acres ; wood, 80 acres ; dairy cows, 60 or 70 ; breeding and suckling, 30 or 40 ; stores and fatting, 150 ; Leicestershire sheep, 1500 ; South Downs, 150 ; stores and fatting sheep, 1800.

Tillbrook.

This parish contains more gravel and mixed soil than many other parishes north of Bedford.

Tillsworth.

The old open-field course is sometimes followed in this parish. The soil is a very strong clay, and complaints are made that wheat does not succeed well after clover.

Tingrith.

Pasture, 410 acres ; arable, 400 acres ; peat land, 80 acres ; wood, 43 acres ; cows, 32 ; sheep, 400 ; hogs (Berkshire), 60 ; cart-horses, 22 ; lace-makers and straw-plaiters (occasionally either), 30.

Tuddington.

Here was formerly a market, but it has been discontinued

tinued many years. Turnips are here sown on the red gravels near the town.

Wrestlingworth.

White clover is sown in this parish.

Here are some loamy soils, which the farmers say would bear good turnips, but would in most seasons be too wet to be fed on the land with sheep.

Woburn.

This is a very ancient enclosure, and many improvements have been made by the late Duke of Bedford in the vicinity.

Potsgrave.

Enclosed perhaps 100 years.

Pasture, 1500 acres; arable, 150 acres; wood, 35 acres; draught horses, 17; breeding sheep, 100 New Leicesters; stores and fattening sheep, 600; lambs fattened, 550.

Composition for tithes.—*Dr. C.*

Cranfield.

This parish is not enclosed, but the subject has been in contemplation.

Enclosed, 300 acres; open-field, 900 acres; wood, 50 acres; draught horses, 60; sheep, 600; Cows, 120; fat calves, 40; lace-makers, 150.—*Dr. C.*

Leighton Buzzard.

This parish, including the hamlets of Heath and Reach, Eggington, Clipstone, Billington, and Stanbridge, is very extensive.

Leighton, exclusive of the hamlets, contains of arable 1500 acres; pasture, 250, mostly Lammas ground.

At

At Grove Bury, 600 acres of sward ; waste land, 400 acres.

Soil, one-third clay, two-thirds sand and loam. Folding sheep, 2000.

Very few cows, except to supply the inhabitants with milk.

Heath and Reach.—Cows, 100 ; horses, 50 ; wood, 300 acres.

Poor, a mixture of lace-makers and straw-plaiters.

Billington.—Cows, 100 ; horses, 40 ; sheep, 800.

Eggington and Clipstone.—Cows, 35 ; South Downs, 100 folded ; Westerns or Wiltshires, 800 or 900.

The effects of enclosing the cold clays of the north of Bedfordshire, are described in a letter from Mr. Maxey, of Knotting, in the 42d volume of Mr. Young's *Annals* ; and as I have found no reason to dispute the correctness of Mr. Maxey's representation, it is here inserted.

“ The effects of enclosing the poor cold lands in this neighbourhood, have proved very prejudicial to the tenantry, and also to the community. What I allude to is, that the farmers, as soon as they have an idea that an enclosure will take place, thinking themselves not interested in the future state of the land, naturally set about making the most of it for the time being ; hence the culture is neglected, little or no manure is bestowed, the dung for two or three years remaining in the yards ; the land cropped with wheat and oats, in some instances, for two or three years previous to the enclosure,

enclosure, and I have known several instances when even the fallows have been sown with oats in the last year, so that the whole of the arable land has then borne a white-strawed crop, consequently, not a foot of that land is fit to sow in the succeeding year; nor can land of this description, and thus exhausted, be brought even to its original state for many years. Hence it is that many farmers of small property, entering on land in this exhausted state, have been ruined; and hence, also, the community has suffered to a great degree, as such lands certainly have not, for ten or fifteen years, produced two-thirds of the grain, nor carried two-thirds of the stock, as before the enclosure. Again, a very small portion of the land is put to its proper use, as the tenants must all become graziers, when, in fact, they have not an acre of land that is calculated for that purpose. Bents are sown in this exhausted foul state of the land, which I conceive to be the most exhausting article that can be sown, and destructive of land already in a weak state, and which ought not to be sown on any other than such as is in a rich state. Hence it becomes still more exhausted, and, after two or three years, is of very little value: still it must be kept in this state, being so ordained by the agent, as he fancies by-and-bye it will become good grazing land, when in fact it is getting worse every year, as it will not carry stock sufficient to manure itself; and no land should be longer in grass than it will carry sufficient stock for that purpose, excepting where dung can be obtained. Such land can by no means be adapted for grazing; but if taken before it be thus exhausted, will be found of treble the value for corn. Notwithstanding the effects of enclosing lands of this description have, in some instances, been extremely

extremely prejudicial, yet with proper management, much good will arise to the public, even from the enclosing of such.

“As to the warm convertible lands, or the deep-stapled clays that are calculated for grazing, I need not say any thing; the great improvements attending the enclosing of such are notorious; and the man must be a novice in business, who does not manage them to advantage: but it requires more judgment and attention to farm poor cold lands to the best advantage, than I have any pretensions to.

“The best method of improving waste lands (as also all the inferior sward in the kingdom, which in its present state deserves no other appellation than waste) is, in my opinion, to convert into tillage all the dry convertible parts of it, as also all the cold inferior parts; but the superior parts of the cold lands that bear a good herbage, particularly in flat situations, will be found of greater value for meadow or pasture. The process that I should pursue and recommend, particularly on the cold lands, is to pare and burn; take two crops of wheat in succession; as soon as the wheat is off, sow tares for spring keeping; in July following sow cole, or turnips; and in those three years it is probable there will be more profit from this land than in the preceding thirty, and the land in a good state for any succeeding crop; for, exclusive of the ashes in the first instance, which I think equal, if not superior to any other manure, this land will obtain more dung in this one year of vegetables (for sheep feed?) than in ten in its original state. You will please to observe, that I am now speaking of the inferior cold sward, which I insist is of very little value in its present state. I have heard many idle objections to ploughing land of this
descrip-

description, but am persuaded it is the only practicable means, in most situations, of improving it, and that, by judicious management, it will at any future time be of much greater value to be laid down for pasture. By such a process, the community would be much benefited at a certainty, and perhaps more expeditiously than by any other means; as by the method here laid down, this land, which in its present state keeps both the stock and the occupier in a state little better than starvation, will produce abundance of wheat, in as little time as any land in the kingdom."

Mr. Foster, of Bedford, expresses nearly the same opinion of the effects of enclosures in the north of Bedfordshire. "It must be owned that in the open field state, the wheat crops were frequently fine, by no means inferior to what we at present see; but in most fields every third year was a dead fallow, if land left unstirred till the middle of summer deserves that name. Except upon the unconquerably rich soils, the spring crop hardly paid seed, labour, and expenses, while the ruinous system of corn-tithe in kind, was constantly preying upon the farmer's purse, straw-yard and dung-hill."—"The enclosures have, however, of late years extended to most parishes, and are beginning to afford a remedy to these defects; but it must be acknowledged, that in the first instance some disadvantages resulted. The farmer obtained complete dominion over the management of his lands, saving some checks opposed by the landlord, which have in few instances been very effectual. A great increase of rent, while the increase of profit was still only in perspective, induced some, and perhaps compelled more, to force the land to a number of exhausting crops, when perhaps it was in a fitter state for a complete fallow.

"Thus,

“Thus, without yielding adequate profits, it became so poor and foul, that a long course of good husbandry will be requisite to restore it. Others again, wishing for the comparative ease and diminished cost of a grazing farm, laid down their fields without that preparatory cleaning, so requisite to ensure a good swarf, and sowed them down with *that vilest of weeds*, the rye-grass. By Midsummer they assumed the appearance of a stubble, and after the first two years, scarcely a leaf of clover could be discovered as bottom-grass. Now, however, time and experience begin to remedy these defects; and the more enlightened farmers, at least, are adopting a mode of culture more appropriate to the different soils, while the rest, with few exceptions, see the impropriety of forcing land beyond its strength, and the necessity of bestowing some attention to cleaning the fallows. Since the enclosures have been general, clover and green crops have been adopted also in many open fields with common consent.”

The late Rev. Mr. Cooper published a pamphlet in 1796, entitled, “Reflections on the cruelty of enclosing Common Field Lands, particularly as it affects the Church and Poor, in a Letter to the Lord Bishop of Lincoln.”

In this publication, Mr. Cooper enumerates several disadvantageous circumstances which occasionally affect the Clergy, such as alterations in the value and interest of money, where the Clergy receive a corn-rent; and where allotments of land are given, the want of new buildings, the inconvenient situation of the land, or an undue estimate of its value, followed in a few years by a fall in the rent, &c.

“The parish of Felmersham,” says Mr. Cooper, “was enclosed in 1765; within sixteen years all the
land

land in the parish, except the third part of one estate, was lowered. A certain lady had three farms there; one lett at 160*l.*: this was reduced to 110*l.* and her others nearly in the same proportion. Under these circumstances, the unfortunate widow was obliged, on family considerations, to sell her estates to the loss of about one-third of their value. In this parish an estate of 52*l.* a year has reduced two tenants, with a wife and six children each, to solicit parochial support; ruined a third; a fourth, more opulent, retired in time; the fifth is now in possession. The impoverished Vicar usually participates of these misfortunes. Here his tenant led the van of this miserable troop, and began his march within the first six years. I have noticed this parish, because the land is in general good; being bounded on three sides by a fine large river; the uplands rather of a stony, scaly soil, convertible, and on which tenants lived comfortably and creditably before the enclosure."

Yet notwithstanding the above, and other observations introduced by Mr. Cooper, I conceive that enclosing has seldom failed to prove beneficial to the Clergy of this county; but much of the public benefit is invariably lost whenever the land remains liable to tithe in kind. Mr. Cooper also further deplores the effects of enclosures in diminishing labour and depopulating the county, by this means and that of laying land to pasture; but I believe the depopulation of the county cannot be proved, nor perhaps the diminution of labour.

"I would not carry your Lordship so far back," continues Mr. Cooper, "as the times of Molmutius Don Wallo, and his son Belinus, who reigned here four or five hundred years before the birth of Christ, were it not to show that the wisest princes of those days,

days, thought the support and maintenance of the plough an object of the first importance."

Mr. Thoroton informs us from the learned Selden's *Janus Anglorum*, "that the said Belinus, lest the land should become empty, or the people frequently pressed for the want of corn, or be diminished, if cattle should occupy the fields which ought to be tilled by men, decreed how many ploughs every county, as we now call them, should maintain; and appointed severe punishments for those by whom the number should be diminished."

Various commotions of the populace are enumerated at different periods of the English history, and down to the present time, by which it appears that the poor have been invariably inimical to enclosures, as they certainly remain to the present day. On the other hand, the opulent have with equal steadiness and perseverance exhibited an inclination to change the best part of the arable to a state of pasture, whenever enclosures or other means have made it convenient.

A cause which has not ceased to act in 2200 years, surely deserves examination. The poor are incompetent judges in many cases. Yet consuming little beside bread, their aversion to the increase of grass-land can scarcely be deemed a prejudice, as it diminishes the quantity of bread corn, and consequently increases its price, while it diminishes the labour by which only it can be obtained. The right of taking tithes in kind seems to me a powerful inducement to the increase of pasture; and were it not rather an invidious task, several instances of its actual operation might be enumerated in this county.

The horse-tax will, I conceive, long remain a memorable proof of the partiality of the landed proprietors to pasture land, even at the end of the 18th

century, with the cry of famine at that time "ringing in their ears." It appears indeed, that the Minister and his supporters considered arable land as more profitable than any other, on account of the temporary high price of corn, though the great expenses attending it must be enumerated among the causes that led to the scarcities which have several times alarmed the nation.

The following extracts from parochial registers, were made with a view to discover the effects of enclosing on the increase of population. They were suggested by the suspicion that the increase is more affected by other causes, than by the consequences of enclosing a parish.

Lidlington.

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1564	15	14	1578	12	8
1565	21	14	1579	13	8
1566	18	13		—	—
1567	21	11		120	95
1568	13	9		—	—
1569	14	5	1580	16	6
	—	—	1581	10	2
	102	66	1582	13	8
	—	—	1583	11	3
1570	11	15	1584	11	6
1571	15	13	1585	14	5
1572	9	6	1586	12	7
1573	12	13	1587	10	3
1574	9	9	1588	3	3
1575	16	7	1589	1	1
1576	14	7		—	—
1577	9	9		101	44
				—	—

1590

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1590	0	3	1616	22	23
1591	7	0	1617	10	27
1592	7	0	1618	18	15
1593	18	7	1619	—	—
1594	15	6		—	—
1595	17	6		155	107
1596	11	15		—	—
1597	16	9	1620	17	6
1598	17	9	1621	17	3
1599	12	2	1622	18	5
	—	—	1623	8	10
	120	57	1624	17	13
	—	—	1625	15	7
1600	—	—	1626	14	17
1601	10	6	1627	14	8
1602	20	6	1628	15	11
1603	13	6	1629	21	15
1604	15	10		—	—
1605	21	2		156	98
1606	13	1		—	—
1607	24	10	1630	14	16
1608	27	9	1631	15	17
1609	17	16	1632	21	10
	—	—	1633	10	4
	160	66	1634	14	18
	—	—	1635	27	12
1610	22	5	1636	18	8
1611	19	11	1637	14	11
1612	20	2	1638	14	11
1613	17	12	1639	15	14
1614	15	8		—	—
1615	12	4		162	121
				—	—

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1640	—	—	1668	10	9
1641	—	—	1669	19	27
1642	—	—		—	—
1643	—	—		145	155
1644	—	—		—	—
1645	—	—	1670	10	10
1646	—	—	1671	14	7
1647	—	—	1672	30	19
1648	—	—	1673	15	12
1649	—	—	1674	24	11
	—	—	1675	9	13
1650	—	—	1676	21	15
1651	—	—	1677	18	8
1652	—	—	1678	25	4
1653	—	—	1679	—	—
1654	—	—		—	—
1655	21	12		166	99
1656	19	21		—	—
1657	14	36	1680	26	—
1658	11	30	1681	16	—
1659	12	34	1682	20	—
	—	—	1683	14	—
	77	132	1684	18	—
	—	—	1685	13	—
1660	17	20	1686	19	—
1661	19	25	1687	22	—
1662	5	9	1688	20	—
1663	18	15	1689	19	—
1664	14	9		—	—
1665	10	10		187	—
1666	20	16		—	—
1667	13	15			

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1690	18	—	1718	16	17
1691	22	—	1719	16	14
1692	19	—		—	—
1693	24	—		150	130
1694	10	—		—	—
1695	27	—	1720	10	27
1696	23	—	1721	16	15
1697	24	—	1722	9	5
1698	17	—	1723	15	14
1699	19	—	1724	12	9
	—	—	1725	12	7
	203	—	1726	14	9
	—	—	1727	17	11
1700	24	—	1728	15	15
1701	23	—	1729	17	21
1702	17	—		—	—
1703	21	—		137	133
1704	18	—		—	—
1705	18	16	1730	11	19
1706	13	13	1731	16	24
1707	15	12	1732	23	14
1708	13	16	1733	22	1
1709	14	7	1734	13	13
	—	—	1735	17	10
	176	64	1736	15	15
	—	—	1737	16	10
1710	16	17	1738	14	9
1711	16	13	1739	18	12
1712	9	11		—	—
1713	12	5		165	127
1714	24	8		—	—
1715	12	14	1740	19	21
1716	11	13	1741	14	32
1717	18	18	1742	17	20

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1743	10	9	1770	17	12
1744	12	14	1771	11	16
1745	18	11	1772	16	16
1746	11	5	1773	16	16
1747	14	10	1774	19	18
1748	13	12	*1775	13	11
1749	16	13	1776	22	14
	<u>144</u>	<u>147</u>	1777	8	10
1750	14	8	1778	18	10
1751	11	7	1779	20	13
1752	10	2		<u>160</u>	<u>145</u>
1753	12	13	1780	19	14
1754	7	12	1781	23	11
1755	12	5	1782	15	16
1756	10	7	1783	23	23
1757	11	6	1784	7	22
1758	11	8	1785	14	15
1759	7	6	1786	13	11
	<u>105</u>	<u>74</u>	1787	14	8
1760	—	—	1788	9	8
1761	11	8	1789	10	9
1762	13	4		<u>147</u>	<u>137</u>
1763	8	12	1790	12	13
1764	9	11	1791	9	9
1765	11	9	1792	24	16
1766	15	15	1793	25	12
1767	7	18	1794	18	9
1768	8	9	1795	11	5
1769	11	13	1796	25	12
	<u>93</u>	<u>99</u>	1797	17	16

* The asterisk denotes the year when the parish was enclosed.

ENCLOSING.

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<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1798	7	13	1802	21	10
1799	27	13	1803	27	9
			1804	17	12
	175	118	1805	15	7
1800	17	15		118	64
1801	21	11			

Marston.

1703	21	22	1722	21	13
1704	15	27	1723	25	12
1705	16	27	1724	21	21
1706	21	17	1725	24	20
1707	8	25	1726	19	18
1708	13	25	1727	12	21
1709	15	10	1728	15	11
			1729	20	30
	109	153			
				192	179
1710	17	17			
1711	19	20	1730	18	18
1712	30	12	1731	14	15
1713	17	11	1732	16	9
1714	28	15	1733	19	12
1715	18	32	1734	10	16
1716	21	29	1735	16	15
1717	23	21	1736	13	8
1718	27	20	1737	17	15
1719	16	24	1738	19	12
			1739	15	11
	216	201			
				157	131
1720	14	13			
1721	21	20			

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1740	15	30	1767	16	22
1741	23	26	1768	11	27
1742	23	17	1769	19	12
1743	17	21		—	—
1744	22	14		170	193
1745	24	18		—	—
1746	24	14	1770	24	16
1747	30	27	1771	22	8
1748	22	26	1772	27	9
1749	27	21	1773	14	12
	—	—	1774	25	14
	227	214	1775	19	10
	—	—	1776	20	18
1750	25	14	1777	29	15
1751	17	11	1778	23	25
1752	28	13	1779	25	28
1753	20	14		—	—
1754	22	18		228	155
1755	20	9		—	—
1756	21	17	1780	26	26
1757	21	11	1781	19	32
1758	13	7	1782	19	25
1759	19	5	1783	24	29
	—	—	1784	15	16
	206	119	1785	23	25
	—	—	1786	18	16
1760	11	15	1787	22	15
1761	23	18	1788	27	17
1762	18	24	1789	22	14
1763	15	25		—	—
1764	20	10		215	215
1765	14	21		—	—
1766	23	19			

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1790	23	16	1800	12	12
1791	24	7	1801	28	9
1792	30	21	1802	24	14
1793	32	14	1803	32	16
1794	24	11	1804	34	17
1795	24	14	1805	21	12
*1796	35	22			
1797	27	16		151	80
1798	26	18			
1799	26	8			
	271	147			

Houghton Conquest.

1734	19	8	1750	18	20
1735	14	8	1751	15	13
1736	17	11	1752	9	6
1737	14	14	1753	15	5
1738	13	8	1754	10	14
1739	11	6	1755	10	9
	88	55	1756	15	12
			1757	15	12
			1758	18	11
1740	15	12	1759	13	14
1741	14	10			
1742	7	16		138	116
1743	7	23			
1744	21	8	1760	16	8
1745	11	9	1761	19	19
1746	21	9	1762	14	18
1747	9	9	1763	12	24
1748	11	14	1764	23	13
1749	17	12	1765	22	16
	133	122	1766	24	35
			1767	13	14
					1768

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1768	17	10	1788	15	14
1769	17	7	1789	18	22
	177	164		166	197
1770	10	12	1790	19	11
1771	19	10	1791	15	11
1772	20	12	1792	17	11
1773	17	12	1793	15	18
1774	17	17	1794	13	4
1775	21	12	1795	20	9
1776	18	17	1796	20	14
1777	16	9	1797	22	17
1778	17	5	1798	15	9
1779	21	17	1799	14	6
	176	123		170	110
1780	11	10	1800	16	7
1781	17	18	1801	13	7
1782	13	30	1802	11	18
1783	19	17	1803	17	10
1784	5	24	1804	12	8
1785	29	29	1805	13	5
1786	19	17		—	—
1787	20	16		82	55
				—	—
<i>Millbrook.</i>					
1700	9	8	1706	9	8
1701	6	4	1707	8	1
1702	8	4	1708	6	8
1703	4	10	1709	8	8
1704	8	8		—	—
1705	5	9		71	68
				—	—

ENCLOSING.

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<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1710	4	11	1737	14	9
1711	7	14	1738	6	5
1712	4	2	1739	15	10
1713	6	4		—	—
1714	5	4		111	80
1715	14	8		—	—
1716	5	12	1740	10	6
1717	11	8	1741	9	9
1718	15	10	1742	10	3
1719	9	10	1743	8	6
	—	—	1744	13	15
	80	83	1745	12	6
	—	—	1746	5	6
1720	4	10	1747	8	8
1721	9	9	1748	7	15
1722	4	4	1749	6	7
1723	12	13		—	—
1724	6	13		88	81
1725	7	3		—	—
1726	9	7	1750	8	6
1727	10	6	1751	3	4
1728	4	10	1752	11	5
1729	12	9	1753	5	3
	—	—	1754	9	9
	77	84	1755	9	6
	—	—	1756	6	10
1730	12	19	1757	11	6
1731	13	5	1758	7	9
1732	8	8	1759	11	5
1733	15	6		—	—
1734	5	7		80	63
1735	14	5		—	—
1736	9	6			

1760

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1760	8	7	1785	9	8
1761	14	9	1786	9	7
1762	9	7	1787	6	7
1763	19	9	1788	12	9
1764	9	9	1789	7	10
1765	10	12		—	—
1766	9	9		93	89
1767	14	5		—	—
1768	2	8	1790	15	8
1769	10	10	1791	10	14
	—	—	1792	11	6
	93	85	1793	10	13
	—	—	1794	7	8
1770	11	9	*1795	8	10
1771	10	11	1796	13	12
1772	12	6	1797	10	8
1773	11	5	1798	15	9
1774	8	7	1799	7	4
1775	16	8		—	—
1776	6	5		106	92
1777	15	4		—	—
1778	7	7	1800	8	9
1779	11	11	1801	7	10
	—	—	1802	8	6
	107	73	1803	8	5
	—	—	1804	18	7
1780	10	12	1805	8	4
1781	19	8		—	—
1782	6	7		57	41
1783	12	12		—	—
1784	9	9			

Amphill.

Ampthill.

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1700	22	30	1727	20	30
1701	34	15	1728	17	34
1702	30	26	1729	17	31
1703	31	20		—	—
1704	29	19		195	256
1705	26	18		—	—
1706	31	23	1730	15	23
1707	26	19	1731	25	18
1708	27	20	1732	24	11
1709	23	20	1733	26	13
	—	—	1734	32	19
	279	210	1735	36	17
	—	—	1736	25	20
1710	26	27	1737	30	36
1711	29	19	1738	32	28
1712	31	4	1739	27	31
1713	21	12		—	—
1714	35	14		272	211
1715	30	34		—	—
1716	44	41	1740	35	32
1717	26	23	1741	27	37
1718	27	31	1742	27	27
1719	26	24	1743	22	23
	—	—	1744	35	23
	295	229	1745	36	27
	—	—	1746	27	33
1720	23	24	1747	21	24
1721	19	21	1748	21	31
1722	21	19	1749	19	26
1723	26	23		—	—
1724	17	31		270	283
1725	17	23		—	—
1726	18	20			1750

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1750	24	17	1777	36	11
1751	19	21	1778	29	22
1752	23	21	1779	28	16
1753	24	20		—	—
1754	20	25		281	201
1755	20	20		—	—
1756	25	17	1780	37	14
1757	25	18	1781	35	27
1758	17	26	1782	34	15
1759	18	29	1783	27	34
	—	—	1784	27	18
	215	214	1785	33	30
	—	—	1786	29	24
1760	21	24	1787	27	13
1761	25	42	1788	37	27
1762	30	16	1789	33	26
1763	15	30		—	—
1764	39	20		319	228
1765	25	26		—	—
1766	21	43	1790	32	23
1767	26	14	1791	29	24
1768	28	20	1792	31	18
1769	28	25	1793	31	23
	—	—	1794	32	22
	258	260	1795	42	19
	—	—	1796	38	18
1770	28	20	1797	29	30
1771	25	33	1798	32	12
1772	29	22	1799	32	30
1773	29	18		—	—
1774	22	30		328	224
1775	26	18		—	—
1776	29	11			

1800

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1800	40	17	1804	39	23
1801	40	24	1805	36	20
1802	31	27		—	—
1803	26	16		212	127
				—	—

Flitwick.

1733	16	12	1754	7	5
1734	10	7	1755	8	4
1735	7	7	1756	9	9
1736	14	10	1757	6	5
1737	10	7	1758	10	5
1738	9	6	1759	12	4
1739	11	10		—	—
	—	—		92	58
	77	59		—	—
	—	—	1760	10	6
1740	4	10	1761	14	12
1741	4	10	1762	9	7
1742	17	16	1763	11	8
1743	9	12	1764	11	3
1744	12	6	1765	9	7
1745	15	6	1766	7	10
1746	15	9	1767	10	7
1747	11	11	1768	11	5
1748	10	9 ¹	1769	10	7
1749	10	17		—	—
	—	—		102	72
	107	106		—	—
	—	—	1770	10	9
1750	9	11	1771	12	13
1751	9	3	1772	12	7
1752	10	8	1773	10	6
1753	12	4	1774	7	9

1775

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1775	14	4	1790	14	12
1776	15	6	1791	5	7
1777	12	12	1792	18	9
1778	18	4	1793	7	6
1779	11	12	1794	7	11
	—	—	1795	13	8
	121	82	1796	14	11
	—	—	1797	16	5
1780	11	8	1798	14	11
1781	8	12	1799	12	4
1782	12	5		—	—
1783	12	11		120	84
1784	9	6		—	—
1785	5	12	1800	16	7
1786	9	13	1801	10	3
1787	8	8	1802	17	7
1788	15	12	1803	21	6
1789	11	9	1804	11	10
	—	—	1805	25	8
	100	96		—	—
	—	—		100	41
				—	—

Felmersham.

1700	9	5	1710	11	6
1701	14	12	1711	7	8
1702	10	16	1712	6	8
1703	11	6	1713	8	4
1704	12	5	1714	10	12
1705	12	22	1715	5	2
1706	11	4	1716	—	—
1707	9	6	1717	—	—
1708	8	7	1718	—	—
1709	7	3	1719	—	—
	—	—		—	—
	103	86		47	40
	—	—		—	—

1720

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1720	—	—	1747	—	—
1721	—	—	1748	—	—
1722	12	—	1749	—	—
1723	7	—		—	—
1724	4	—		34	30
1725	8	—		—	—
1726	4	—	1750	9	6
1727	8	—	1751	13	11
1728	5	—	1752	8	6
1729	10	—	1753	9	4
	—	—	1754	10	9
	58	—	1755	12	7
	—	—	1756	12	12
1730	1	14	1757	7	3
1731	9	8	1758	13	4
1732	10	9	1759	8	7
1733	9	2		—	—
1734	13	9		101	69
1735	7	7		—	—
1736	10	12	1760	6	5
1737	11	8	1761	10	4
1738	7	1	1762	9	11
1739	7	9	1763	20	10
	—	—	1764	12	11
	84	79	•1765	12	6
	—	—	1766	9	18
1740	5	4	1767	12	8
1741	6	6	1768	9	8
1742	5	7	1769	20	6
1743	12	7		—	—
1744	6	6		119	87
1745	—	—		—	—
1746	—	—			
BEDS.]					1770

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1770	12	8	1790	17	8
1771	12	12	1791	2	9
1772	7	11	1792	12	5
1773	9	8	1793	7	7
1774	11	10	1794	11	5
1775	9	10	1795	17	8
1776	16	4	1796	5	9
1777	15	7	1797	9	11
1778	14	5	1798	8	8
1779	14	6	1799	9	10
	119	81		97	80
1780	11	11	1800	9	14
1781	15	13	1801	18	9
1782	12	12	1802	10	4
1783	4	9	1803	8	7
1784	10	8	1804	12	6
1785	10	7	1805	10	8
1786	7	11		—	—
1787	9	18		67	48
1788	11	6		—	—
1789	15	14			
	104	112			

Aspley Guise. A. Y.

1722	9	2	1728	9	9
1723	6	17	1729	10	16
1724	7	6		—	—
1725	11	7		77	74
1726	14	5		—	—
1727	11	12			

1730

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1730	6	4	1757	9	6
1731	4	4	1758	8	9
1732	9	9	*1759	7	8
1733	5	5		—	—
1734	9	8		81	71
1735	3	13		—	—
1736	8	4	1760	7	9
1737	7	5	1761	10	17
1738	8	8	1762	9	9
1739	8	10	1763	8	5
	—	—	1764	12	7
	67	70	1765	12	9
	—	—	1766	10	16
1740	10	10	1767	10	15
1741	6	5	1768	9	10
1742	8	7	1769	10	3
1743	14	6		—	—
1744	7	5		97	100
1745	11	4		—	—
1746	11	7	1770	11	9
1747	12	3	1771	12	8
1748	11	6	1772	15	7
4749	16	12	1773	14	7
	—	—	1774	14	5
	106	65	1775	11	6
	—	—	1776	12	13
1750	7	8	1777	12	10
1751	8	5	1778	15	16
1752	6	5	1779	9	8
1753	11	9		—	—
1754	10	10		125	89
1755	11	8		—	—
1756	7	3			

<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>	<i>Years.</i>	<i>Baptisms.</i>	<i>Burials.</i>
1780	21	14	1790	15	14
1781	11	11	1791	18	11
1782	14	8	1792	17	5
1783	13	25	1793	22	11
1784	10	12	1794	16	15
1785	20	11	1795	24	10
1786	9	14	1796	13	17
1787	19	14	1797	14	8
1788	12	10	1798	18	11
1789	12	8	1799	16	12
	141	127		173	114

Average

Average Number of Baptisms in Three old Enclosures, with the Number of Inhabitants in 1801.

Years, inclusive.	Ladlington, 559 Inhabitants.	Felmersham, 267 Inhabitants.	Aspley Guise, 627 Inhabitants.	Total.
1564 to 1569	17	—	—	17
1570 to 1579	12	—	—	12
1580 to 1589	10	—	—	10
1590 to 1599	12	—	—	12
1600 to 1609	17½	—	—	17½
1610 to 1619	17½	—	—	17½
1620 to 1629	15½	—	—	15½
1630 to 1639	16½	—	—	16½
1640 to 1649	—	—	—	—
1650 to 1659	15½	—	—	15½
1660 to 1669	14½	—	—	14½
1670 to 1679	18½	—	—	18½
1680 to 1689	18½	—	—	18½
1690 to 1699	20½	—	—	20½
1700 to 1709	17½	10½	—	27½
1710 to 1719	15	8	—	23
1720 to 1729	13½	7½	9½	30½
1730 to 1739	16½	8½	6½	31½
1740 to 1749	14½	7	10½	32
1750 to 1759	10½	10	8½	29
1760 to 1769	10½	12	9½	32
1770 to 1779	16	12	12½	40½
1780 to 1789	14½	10½	14	39½
1790 to 1799	17½	9½	17½	44½
1800 to 1805	19½	11	—	30½

Average Number of Baptisms in Five Parishes lately enclosed, with the Number of Inhabitants in 1801.

Years, inclusive.	Marston Moretain, 709 Inhabitants.	Houghton Conquest, 507 Inhabitants.	Millbrook, 327 Inhabitants.	Flitwick, 436 Inhabitants.	Total, except Ampthill.	Ampthill, a Market Town, 1294 Inhabitants.
1700 to 1709	15½	—	7	—	22½	28
1710 to 1719	21½	—	8	—	28½	29½
1720 to 1729	19½	—	7½	—	27	19½
1730 to 1739	15½	14½	11	11	52½	27½
1740 to 1749	22½	13½	8½	10½	55½	27
1750 to 1759	20½	13½	8	9½	51½	21½
1760 to 1769	17	17½	9½	10½	54½	23½
1770 to 1779	22½	17½	10½	12	63	28
1780 to 1789	21½	16½	9½	10	57½	32
1790 to 1799	27	17	10½	12	66½	32½
1800 to 1805	25	13½	9½	16½	64½	35½

Observations.

By the preceding tables it appears, that the population had not increased very remarkably till about the year 1770; and it is observable, that the increased price of provisions, and the rapid growth of the taxes and the national debt, took place at nearly the same time.

The tables seem to indicate nearly an equal increase of population in the unenclosed parishes, as in those which have been enclosed many years; yet it is evident, a greater number of instances must be collated before any satisfactory evidence is procured.

The population of Lidlington, according to the average number of the baptisms, was as numerous as at present more than a century ago, and was not much inferior at the distance of two centuries. It has, however, increased remarkably within the last thirty-five years, though without any adequate cause, that I can perceive, in the state of agriculture.

The population of Felmersham, had increased at the time of the enclosure, after which it remained stationary for some years, and has since declined, though much of the parish is under the modern improved husbandry of clover and turnips.

In Aspley Guise, the increase of population appears rather remarkable; but this is probably affected in some measure by the large academy in that parish. In the parishes which are lately enclosed, the increase of population is certainly not owing to remarkable exertions in agriculture. The increase in Flitwick is remarkable; and in Marston it was nearly doubled in the century preceding the enclosure, though without any adequate cause in the apparent state of the husbandry.

bandry. The population has been on the decline since the enclosure, on account of the great quantity of land laid to grass and fed with sheep.

The farm with which the Writer of these pages was best acquainted, has been quadrupled in size, and the dwelling-house almost rebuilt, to be inhabited by a *shepherd*! who performs the greatest part of the business, which, in the state of open-field arable, would have employed fourteen men, at twenty-one acres each. (See Calculations of Expense and Profit).

The population of Houghton has lately declined, without any apparent cause: such is also the case at Millbrook in some measure, though the cultivation of a part of the warren must have increased the labour.

The parishes which have been mentioned are little affected by dissenters, but in Ampthill, they are rather numerous, and consequently the population may have increased more than appears by the baptisms.

SECT. II.—FENCES.

“ In treating of the Bedfordshire enclosures, it is just to observe, that the young fences appear to be better planted and guarded in this, and some of the adjoining counties, than in any other part of England. Where the soil is dry, the double row of white-thorn quicks is planted on a low bank, level or rather hollow at top, with a slight ditch on either side. In the clays a deep ditch is made on one side, and a bank on the other, the plants being set on a ledge or tabling on the declivity. This, however, should not be so steep as to cause the roots to be washed bare.

The ditch is made in the form of a V, sloping on the sides, thereby preventing its coultling in (to which the clays are most subject), and narrow at the bottom, to contract the water-course, which then in declivities will hardly fail to keep itself clear; also to render it more difficult for cattle to walk in.

“A double or treble post and rail then protects both sides, placed not too near the quick. These are cut off about an inch from the ground when planted, and again after the first or second year. The decided superiority of our fences, cannot but be apparent to any one who impartially compares them with those of Yorkshire, of one row of quicks, ineffectually attempted to be secured by a single rail at top; or with either the old or new hedges of Norfolk, planted on the hedge of a high and steep bank, protected only by a deep ditch on one side, and by those at the top of the bank on the other. Both the Norfolk and Bedfordshire modes have been tried, and the superiority of the latter evinced on the farm of the Rev. H. Y. Smithies, of Little Staughton, a gentleman whose spirit, perseverance, and success, in introducing perfect Norfolk husbandry into the Bedfordshire clays, merit the thanks of the county, and go farther to silence objections, than volumes of discussions.”—*J. Foster, Esq.*

White-thorn is generally used in this county in the formation of new fences, but there are several instances of the use of crabsets, as at Ridgmount, Millbrook, &c.

The crab appears to grow well on poor sands, yet it does not form so good a fence as the hawthorn. The roots of the crab are said to be liable to perish when the hedge is cut, and they appear frequently affected by blights and mildew, and are liable, when young, to be much injured by hares and rabbits.

Instances

Instances of the holly hedge may be seen at Flitwick, Woburn, and Aspley. They are very ornamental, but are too slow in their growth to produce any considerable profit.

The mode of fencing which is generally esteemed in the gravelly district, and in the east, and much of the northern part of the county, consists of two rows of sets, which are about twelve inches apart, and five or six inches in the rows. A considerable ditch is made on each side, and posts and rails are placed on the edge of both sides of the bank. The operation of finishing the ditches, leaves a hollow in the middle of the bank, which is supposed to be useful by collecting the water towards the roots of the quicksets. This kind of fence is supposed to be capable of resisting sheep, &c. in less time than those which are set on a sloping bank. The posts and rails are commonly taken away in six or seven years, and occasionally in four years, the ditches, or at least the one next to public roads, &c. being then scoured out, and the fence moulded up as high as possible. When a fence is made on the edge of a sloping bank, the angle of elevation should scarcely exceed forty-five degrees, as in other cases the earth crumbles away, and leaves the roots of the *quick* uncovered in a few years.

The expense of fencing, including wood and workmanship, is about 10*s.* 6*d.* per pole in several places.

At Millbrook, gates cost 2*l.* 2*s.* and stiles 12*s.* each.

At Marston and Dunton, the quicks on Lord Spencer's estates consist of two or four rows of hawthorn on the edges of a bank four or five feet wide, with a row of trees sometimes in the open interval between the double quicks. It does not appear that this method possesses any merit worthy of recommendation.

The

The Rev. Dr. Wood, of Marston, fenced a part of the glebe with a single row of quicks, but the Bedfordshire fences are evidently of a superior kind, and are not likely to give place to any other. Young fences require good management; they ought to be weeded at least twice a year, and if they become mossy and stunted in their growth, they should be cut off close to the ground.

It is not very common to plant timber trees in new fences, but there are several instances to be met with.

Trees are very injurious to fences, as also to the corn, &c. in their vicinity, and the exhaustion of the soil by the spreading roots, seems a far more powerful agent of mischief than *the poisonous drip of their leaves*, which has been often mentioned. A few trees of various kinds are sometimes planted in the corners of the fields, as at Sundon, Bedford, &c. and at Blunham I observed some rows of elm between the road and the ditches, on the other side of which the fence was planted.

At Northill and a few other places, the hedges are sometimes cut down at twelve or fourteen years growth, and dead hedges made to protect them from the cattle; but the common method of cutting hedges, consists in lopping off with a hedging bill the greater part of one of the rows, and cropping the tops of the other side at about a yard high, in such a manner as to form a loose kind of hedge, with live stakes and layers cut half in two, near the ground, and intertwined among the stakes sufficiently to maintain their position without *eddering* the top.

The sides of the hedge are cut alternately; and as a time is chosen when the side which is cut will not be much exposed to the sheep for one or two years, it requires

requires no other guard than a few loose bushes slightly covering the roots from which the branches have been separated. This business, including the scoufing of the ditch, costs from 6*d.* to 8*d.* per pole, with a faggot per day.

With the double object of securing a good fence, and a considerable quantity of fire-wood at a small expense, I conceive the above method is as effectual as any that can be adopted.

CHAP. VII.

ARABLE LAND.

SECT. I.—TILLAGE.

THE various operations of tillage, as performed in this county, present very little that is remarkable for singularity or utility. The farmers do not read Virgil's Georgics, yet the north of the county in particular, is distinguished for the Virgilian, or *salerit* husbandry, as it is termed by Tull, as many of the farmers are careful not to injure the land by *too much* tillage.

Ploughing.—The usual depth of this operation varies from four to five inches, and many people entertain the opinion, that if land be ploughed six inches deep, it *requires* more manure than usual. It will be readily acknowledged, that if this opinion be well-founded, the question is decided in favour of moderate depths; but it has always appeared to me in the light of a theory, which was contrived for the defence of ancient customs. In the parish of Ridgmount, a road was made across the ends of some ridged lands, and in this operation, the cultivated soil of the ridges was cast into the hollows. The field was afterwards sown with barley, and the scattered corns which grew where the soil was accumulated in the ancient furrows, formed a remarkable contrast with the rest of the field.

The

The produce of the barley crop was little more than three quarters per acre, while that which grew on the same poor soil, accumulated perhaps a foot deep, was remarkably luxuriant; many of the corns producing from ten to twenty stalks, and the ears large in proportion. This effect can be ascribed to no other cause than the *depth* of the soil.

The propriety of deep ploughing depends, however, on the nature of the subsoil, for when this is nearly the same in quality as the cultivated part, no injury can arise from exposing it to the atmosphere, and mixing it with the tilth; but, on the contrary, a great benefit in the growth of tap-rooted plants, such as carrots, beans, &c. which are naturally inclined to penetrate very deep into the ground.

But it must be confessed, that when ground is ploughed very deep, it increases the difficulty of destroying couch, &c. for which reason it may not be proper to plough deeper than five inches in general. On thin-stapled clays, of which the substratum is often yellow, or blue, the general practice is to plough shallow, as the farmers expect nothing but injury from ploughing deeper than common.

If any benefit is to be obtained from ploughing clays deeper than common, it is obvious that the fallow season is the time when the experiment ought to be made, as the raw earth may be ameliorated by exposure to the air, though it could not fail to injure any crop that was sown upon it immediately after the first ploughing. The farmers in the chalky district are careful not to plough so deep as to bring up the "*noxious hurlock*," which is frequently very near the cultivated soil. Till of late, upon all our clays, ploughing was performed by three, four, five, and even

even six horses, lengthways, and a driver. Those who have tried two a-breast, find that, independent of the vast saving, the work is performed easier and better. The ploughman, however averse at first to this mode, will, when once accustomed to it, think it a hardship to go in the old way, which sometimes, however, may be requisite in January or February, when the tread of the horses a-breast would injure the rich earth. Yet even in the most workable soils, such is the effect of prejudice and a determination not to be instructed, that by far the most farmers persevere in using three or more horses, and a driver."—*J. Foster, Esq.*

Bad ploughmen are remarkable for leaning the plough to the left hand, by which means a part is left unploughed, or only stirred about three inches deep, and consequently a part of the benefit of tillage is lost. It seems necessary that the point of the share should pierce the ground about half an inch deeper than it is cut on the side of the mould-board, to counteract the disposition of the plough to go too wide; but it should never lean farther to the left than is necessary to effect this purpose, nor ought the ploughman to tread on the unploughed soil.

An acre is called a day's work for a plough; but on the general average, including bad weather, accidents, &c. it is probable that three roods is nearer the truth.

Harrowing—is generally performed with two or three horses, and a leader and driver; but sometimes the horses are guided with reins, in the same manner as the ploughs with two horses a-breast.

His Grace the Duke of Bedford has a machine, which was invented by Mr. Wildes, of Nottinghamshire, for the purpose of enabling the farmer to harrow the land, while

while the horses walk *only* in the furrows. The machine consists of a long axle-tree with a small wheel at each end, and a pair of shafts for the thill-horse to draw with; and the harrows are attached to the machinery at any distance from the furrow which may be required.

Ridges.—All the clay land in the county is in the state of high ridge and furrow, bent at the ends into a serpentine form, by some uniform cause, which, in the course of many centuries, has removed the ends of the lands entirely out of their original places.

The width of the ridges is, I conceive, about seven yards on the average, and their direction, generally, from the lowest ground to the highest, under an erroneous principle of drainage. Mr. Smith, of Kimbolton, who has ploughed up some old level pastures, has raised them into ridges about three yards wide, which he thinks (and apparently with much reason) is the most proper width for ridges on clay soils.

There are a few who think the ridges ought to be wide, that they may be more out of the reach of the water; but the most intelligent farmers regret that any ridges are more than three or four yards wide, and as a partial remedy, form small ridges between the large ones, consisting at first of two or three bouts of the plough, and gradually enlarge them.

In the ridges of eight or nine yards wide, the furrows are necessarily *very* deep, and consequently the difficulty of laying them dry is increased by their width; and the best soil being continually turned toward the highest part of the land, the furrow or lowest part can be nothing but a clung barren subsoil, which the farmers in other cases are so careful not to disturb. The

reason

reason of elevating clay soils into ridges, is evidently no other than that of obtaining an outlet for the water as soon as possible. The higher part of the land becomes dry first, and the water gradually filters through the soil till it enters the open furrow; but as it is of importance to get free from the water as soon as convenient, this is evidently to be obtained only by small ridges, which may be presumed to become dry in nearly half the time as would be required for those of a double size.

The expediency of flattening and altering the direction of the ancient ridges, is thought very doubtful in this county. That a present loss would be sustained by the measure, is too obvious to be insisted upon; and a tenant at will cannot be expected to look forwards to benefits which may not arrive in less than seven years. The practice of hollow-draining the furrows is, however, essentially necessary, previous to levelling the ridges, and the land may be laid sufficiently flat to permit the operations of drilling and horse-hoeing, in any direction, without entirely destroying the appearance of the ancient ridges.

The ridges are levelled in most places where the soil is dry, as in the gravelly, sandy, and chalky districts; and even on such soils, the accumulation of vegetable mould in the ancient furrows, renders them more fertile than the ridges for many years.

Stitches of a yard wide, or two-bout lands, are common in the chalky district, and are thought useful; but it seems difficult to define the nature of their utility on dry soils, unless it be supposed to consist in the depth of the tilth, which is by that means increased.

Putting in Crops without ploughing.—"The
scuffle

scuffle has been used by some farmers, and with so much success, that no person having much clay land in an arable state, should be without it. When the fallows or clover leys are once or twice stirred with the plough, a scuffle will do more good than any ploughing, and perform five acres in a forenoon. It has been used for sowing wheat, and found upon trial to exceed either ploughing or harrowing the corn in.

“It is particularly adapted for putting in spring corn. If the land has been broken up before the frosts, the fine ameliorated earth will of course be at the surface. If you plough after this, you bury this fine mould, and bring up a livery bottom earth, which will yield to no tool till it has either been frozen again, or cracked with dry weather. If you harrow in, the seed will often be so imperfectly covered, that a great portion will become the prey of crows, pigeons, and small birds. But both these objections are obviated by scuffling in the spring corn, of whatever sort; and if the weather be dry, the land gains a most beneficial working; and if drought succeeds, it will go far towards weakening the twitch, and other root weeds, and render the operation of the next fallow less arduous. The surface of the ground also, by not being so fine worked, but rather more cloddy than after the harrow, will have less disposition to produce annuals, many of which come up in exact proportion to the fineness of the top mould, while this is of no use whatever to the grain.”—*J. Foster, Esq.*

I am informed that a field of barley was sown without ploughing many years since at Liddington, in consequence of the extreme stickiness of the subsoil; the crop was good, but no subsequent trial took place.

A ridge of barley, sown without ploughing, in the
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present season, by way of experiment, was apparently neither better nor worse than the adjacent ridges on each side of it. Were the land to be drilled and hoed, there is much reason to believe that it should not be ploughed in the spring; but under the present mode of husbandry, it might be rather prejudicial to adopt the practice in Bedfordshire. The farmers expect to destroy a quantity of weeds by the spring-ploughing, and such as plough the fallows but two or three times previous to barley seed-time, ought to be informed with some degree of caution, that they give the land one ploughing more than is of any utility, lest they be tempted to lay aside the use of the plough entirely.

SECT. II.—THE ROW CULTURE.

THIS term comprehends the various operations of drilling, dibbling, horse-hoeing, and hand-weeding, which in the opinion of the most intelligent writers on the subject, ought to be considered as essentially connected with each other. There are a considerable number of farmers who have made partial attempts at drilling, in different parts of the county; but the number of those who have practised the *row culture*, as above defined, is very small; among whom the most decided advocate of its utility on all soils, is the Rev. H. Y. Smithies, of Little Staughton, who favoured me with the following remarks on that subject: “In giving you my opinion on the several questions which you have put to me, on the practicability of the drill system of husbandry, in a strong and tenacious clay, you will observe, that I uniformly premise, what ought to be the case under

der any system that a complete under-drainage of the land has taken place; not merely by making hollow-drains at a proper distance from each other, but, as is seldom done in this part of the country, by ditches of a proper width and depth being made over the farm, to afford a ready conveyance of the water from the vents of the drains. That any soil is too stiff to admit of the good effects of under-draining, if the drains be placed at no greater distance than such as may be adapted to the tenacity of it, is a doctrine to which I cannot yet be induced to subscribe. Deep ploughing and good tillage will, in my opinion, always produce a surface so pervious to the water, that where the drains are not too far asunder, viz. in a very strong clay more than five yards, it will readily find its way to them. Upon land thus prepared, I think there need be no apprehension of a season, 'so wet as to render it impracticable or imprudent to drill the corn.' That immediately after rain upon a clay soil, the coulter of the drill 'will clog with dirt, the seed be ill covered,' &c. will undoubtedly be the case; but at such a moment, the use of the drill should not be attempted.

"One fine day, and in many instances a few hours, will do away this obstruction; and as, when the machine is at work, from eight to twelve acres a day may be drilled, no season that I ever remember, failed in producing an opportunity for the farmer to put in the whole of his seed, to whatever extent his crops might be, in at least as good time as his neighbours were enabled to do it. The objection, that by drilling beans, 'the ground will often be injured by treading, &c. and become baked, and cannot be (hand) hoed to any advantage,' is, in my opinion, so ill-founded, that I think drilling beans, by the facility which is given to

early horse-hoeing, is the most certain mode (the only one, indeed, that I have discovered) of preventing those evils.

“ You will understand, that my land intended for beans, or any spring crop on my clays (where turnips have not been grown), is never ploughed after Christmas; but lies from the autumnal ploughing till the surface is sufficiently dry to admit of the use of the cultivator, or sometimes only a heavy harrow, which precedes the drill. Thus the seed is deposited in a bed of fine mould, which has had all the advantages of an exposure to the winter frosts, &c. and which does not, from being stirred with the horse-hoes soon after the plants are up, ‘ become baked,’ but, on the contrary, is easily kept in a loose and pulverized state during the summer.

“ Perhaps the last spring (1806) was as unfavourable to the sowing and hoeing the bean crops on clay soils, as most seasons that have been remembered, from the great quantity of rain that fell in the early part of it, being succeeded by a long and parching drought. Notwithstanding these circumstances, I was enabled to keep the soil between the rows of the beans perfectly loose, and the stubble was left in a clean and mellow state, as you witnessed when I had the pleasure of seeing you here, at the time the crop was carting off the land. Of the crop itself, you may recollect that you pronounced it remarkably good, though the land had not been manured for it, and is of an inferior quality. That part of my farm which is ‘ in this county denominated woodland,’ I certainly think does not require so much tillage as some of the other parts, where the soil is of a more stiff and tenacious texture (because the effect of pulverization is produced without it); but I am never
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under any apprehension of its being too fine in the fallow state, as the drainage prevents any probability, that 'from fine tillage it will become a kind of plaster from the wet.' It is not a part of my system to sow wheat upon a fallow, but on a clover-ley or a pulse-stubble; thus I never find any want of 'autumnal hoeing,' to prevent the wheat from being root-fallen. On a fallow, in the last kind of land particularly (woodland), it is very liable to be so, and probably from the frosts elevating the surface of the soil, in the manner described by Dr. Anderson, amongst others.

"I usually sow wheat rather earlier on this kind of land, that the plants may acquire a certain degree of strength, and firmness of root-hold, before the winter, but seldom much before St. Michael.

"'The sowing of seed by drilling,' is certainly an object of very considerable importance; but by no means, in my opinion, ought to be practised to the extent recommended by some advocates for the system. Nor do I recommend the extravagant distance at which some hold it proper to place the rows of corn, as it often, from promoting in the plants too continued a tendency to branch, is the means (at least so it appears to me) of producing a thin, coarse, and mildewed sample.

"From my own experience, and what I have observed in the practice of others, I am led to think, that nine inches is the best distance for the rows in drilling of wheat: at that distance I put in six pecks of seed per acre, which creates a saving, when compared with the usual practice of sowing broad-cast in this neighbourhood, of from four to six pecks.

"Of barley and oats, on the same comparison, I save about half the seed, by sowing from eight to ten

pecks; and of beans and pease, about two bushels are saved by drilling not quite three.

“ In clover-seed the saving is very considerable, as a most regular and abundant crop is obtained from three pounds and a half of good seed per acre. This I drill amongst my barley, after once horse-hoeing, in rows seven inches asunder.

“ Of the meliorating influence of the atmosphere, I have the same opinion with yourself; and there cannot be a doubt, but the friable state in which the surface of the land may be kept (even when under a crop) by the drill husbandry, affords a much greater opportunity of obtaining this benefit than the broad-cast system can possibly do. This I consider as no small advantage in favour of drilling; but when to this are added, among many other advantages of inferior consideration, the facility which it affords of destroying weeds (which, notwithstanding what many may say, are universally attendant on the broad-cast husbandry in this neighbourhood), the important saving of seed, the crop being less liable to be laid before harvest, and the common result of its being superior in produce both in corn and straw, it should appear that prejudice or indolence, more than reason, operates in retarding the progress of the system. Of its practicability on stiff and tenacious clays, I can speak without the smallest hesitation, as that kind of soil constitutes a great proportion of my farm, and I use the drill for every vegetable that I grow upon the arable part of it.

“ So far from thinking that a clay soil is unfavourable to the adoption of the system, it is, in my opinion, when under proper management, *preferable* for the purpose.”

Mr. Foster's opinion on the same subject is as follows :

lows : “ I shall not here enter into the general question of the preference of the drill or the broad-cast system, a point that has been already discussed by persons of much superior experience and information, but shall content myself with examining in how far, and in what manner, it is applicable to our clays. Generally, however, may I be permitted to observe, that if it even cannot be made to appear that drilled crops are the most productive, yet unless it could be proved that they are, upon the average, considerably less so, the saving of seed, and the benefit the earth receives from being cleaned and opened by the hoe, in seasons when most good is thereby effected, seem to decide the question of preference in favour of the drill. In the parts where this implement is most generally and successfully used, there is this remarkable difference: in Norfolk, almost every thing is drilled except turnips; whereas in Lothian (in Scotland), white-strawed corn is more generally broad-cast, while beans and turnips are universally drilled in great perfection. As far as the experiments go which I have been enabled to make repeatedly, though on a small scale, the drilling of wheat and barley has succeeded only when the ground was in such a state that the seed went in well, while I have always obtained very superior crops of drilled beans and of turnips, whether planted in the Lothian manner, with the dung under the rows, or by spreading the dung all over, and this upon soils naturally the worst calculated for the growth of turnips.

“ Drilling has not, to my knowledge, been tried by any other person in the north of Bedfordshire, except by the Rev. Mr. Smithies, of Little Staughton, who practises it for all purposes, even for tares and clover. Here this mode of husbandry may be seen in almost the

same perfection as in Suffolk, upon a farm consisting partly of a very dirty clay, and partly of a binding, not very kind, gravel.

“ Before this mode of culture can be attempted on wet clays, the first step should be, to drain all the furrows in the manner before described, or with a drain-plough. In a clay, where the superfluity of moisture does not so much arise from springs, or, at most only from such as are near the surface—where there is a general retentiveness of wet, sickening every useful plant—deep cross-drains will never effect a perfect remedy ; but drains must be brought home to every part of the land, and great depth is quite superfluous.

“ As most clays are in a state of high ridge and furrow, before these can be drilled well, or, indeed, ploughed without gores, and much turning upon the lands, it will be requisite to alter this shape, and lay them more flat. This operation will seldom be relished by tenants, as it must be allowed that some loss will unavoidably be sustained in two or more crops. All soils, except indeed fine black moulds and rich sands, will only be found fit for the production of vegetables to a given depth from the surface, generally from three or four to eight or ten inches, as far, namely, as the effects of culture and the changes of the atmosphere can convert the substrata into soil.

“ If a part of the lower stratum be for a length of time exposed to the air, heat, frost, and culture, it will be converted into nearly the nature of the ploughable earth near the surface ; if, on the contrary, a portion of this were buried for a long time, it would lose its friability, and become, for a time, more similar to the substrata : for this reason, were high-ridged land at once to be levelled, it would infallibly be found, that
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those places where the ridges were before, would be barren and unworkable for many years, while in the former furrows there would be an useless thickness of mould.

“ The change, therefore, should be effected gradually, and should be the work of many years. The first step ought to be, to form little fresh lands in the former furrows ; this will also have a good effect in their becoming less deep, and the water thereby obtaining a freer course to the place of its exit, which may be of great consequence where there are no furrow-drains. These little lands, after having been once formed, should upon every occasion be augmented, by taking something off the larger ones ; and when the fallow year comes, the land should, after the first ridge-ploughing, be cast twice, and then cross-worked.

“ In the last ploughing of the fallow, the new ridges should be struck out by a workman who can plough true and straight. In the clays, their breadth should be ten feet to ten feet and a quarter, taking in two breadths of Cook’s drill. If the close is not square, they should still never be pointed, or of diminishing width, but should abutt against a broad headland on the uneven side of the close, whereby their straightness and uniform breadth will be preserved. If the old lands were very high, their form will not then, and ought not totally to disappear, nor will this, indeed, be the case till a second fallow comes round ; yet after the first fallow, drilling will be practicable, though not quite perfect.

“ Or if the husbandman prefers broad-casting, still the straightness of the land will render his work more easy, expeditious, and correct. After the trials I have made, I am still decidedly for drilling, even on clay land ; yet it appears to me, that there may be particular

lar cases, when weather and circumstances will render broad-casting more expedient.

“ In the first place, when clover-ley is ploughed up for wheat, it will often, in wet seasons, be streaky and clung, and in this case, dibbling will answer best, and broad-casting better than drilling. If it is very dry, the whole soil is a mass of steely clods; and those who are accustomed to light-land farming will scarcely conceive how very much rain is required to penetrate them sufficiently to yield to the harrow. When abundant and successive rains are at length arrived, perhaps the best season is past, and it may be some weeks before the surface is again dry enough for the drill, and we are exposed to all the disadvantages of late sowing, injury by the severity of the winter, and the baneful effects of mildew.

“ The remedy which has been pointed out for this difficulty of drilling clover-leys has been, to plough some weeks before sowing, to obtain a mollified surface, and I have no doubt this would answer the purpose, were it always practicable.

“ But then if the clover is for seed, the field is not clear till full time for wheat-sowing. If it is mowed twice, it will indeed be off the ground in the latter end of August; but in the pressure of work towards the latter end of harvest, it may be impossible to find time to plough. When harvest is over, it is, in my idea at least, the best time to carry dung upon the grass land; but were this even omitted, in many and indeed most seasons, the stiff land clover-leys are at this time so dry, as to be impenetrable to the plough, and the obstacles to drilling that have been before mentioned take effect.

“ Should this, however, be otherwise, or should the
weather

weather be favourable at Michaelmas, I certainly would drill my clover-ley wheat.

“ With beans I give a still more decided preference to the row culture, though even here there are, in some seasons, obstacles to encounter. If the ploughing of bean land takes place only after the last frosts, it will rarely admit of drilling, but should be dibbled ; if ploughed in time, the earth is sure to be pulverized, but sometimes there is a want of dry weather. In the present spring, for instance, we have reached the 12th of March before we had a single day in which beans could be drilled ; but in a few days afterwards they went in perfectly well. I would sooner wait beyond the best season of sowing, than forego what I deem, connected with subsequent hoeing, to be so very advantageous to a bean crop, and to the state of the land afterwards.

“ With regard to barley, if the ploughing be done before the last frosts, and the land not afterwards stirred, otherwise than with the scuffle or harrow, drilling will be sure to succeed ; but where the turnips are not off till late, and the ground, consequently, cannot be stirred till the latter end of March or April, in this case, strong lands will be too rough and harsh for drilling, and iron-rolling, and then scuffling in the barley will answer better.

“ In drilled barley or wheat, I put in the clover-seed at the time of hoeing, passing a harrow over after the hoe. If the barley is broad-cast and early sown, I harrow in the clover-seeds when the barley is well up ; but if sown late, I prefer to let the clover go in at the same time as the barley, for fear of severe drought succeeding.”

In addition to the above quoted remarks of the Rev.
Mr.

Mr. Smithies, and J. Foster, Esq. I have not been able to obtain any written communications from the drillers of Bedfordshire; but having had an opportunity of witnessing the effects of drilling in several small attempts that have been made on the farm where these pages are written, and entertaining the opinion, that an investigation of the elementary principles of the row culture is among the greatest desiderata of agriculture, I shall offer a few remarks on each of its branches.

But it may be proper, in the first place, to give an account of a comparative experiment on drilling wheat, which was made at Lidlington.

The soil of the field where the experiment was made is sandy, has not been marled within 30 years, and contains scarcely any traces of chalk. It was a clover-ley, which had been fed two years with sheep and cattle, and contained much white clover, though nothing was sown but red clover and ray-grass. The skim-coulter was used, to prepare the land more effectually for drilling, though it is not absolutely necessary for that purpose.

The principal particulars of the experiment may be found in the following table.

*Comparative Experiment on Drilled and Broad-cast
Wheat on a Sandy Soil, 1804.*

	Drilled five Acres and a half.			Sown five Acres and a quarter.		
Time of sowing, - - -	Nov. 17 & 20, 1804.			Ditto.		
	Load.	Bush.	Dec.	Load.	Bush.	Dec.
Quantity of seed, - - -	1	4	87	2	4	75
Ditto per acre, - - -	0	1	79	0	2	81
	£.	s.	d.	£.	s.	d.
Value of seed, at 2l. 2s. per load,	4	2	10½	6	3	10½
per acre, - - -	0	15	0½	1	3	7
Saved in seed per acre, - -	0	8	6½	—	—	—
First hoeing, April 15 to 23,	1	15	8	—	—	—
Second hoeing, and weeding, } May 11 to 17, - - -	2	10	8	—	—	—
Third hoeing, June 1 to 4, -	1	6	3	—	—	—
Hand-weeding, June 6 to 9, -	0	19	4	0	15	8
Total expense, - - -	6	11	11	—	—	—
Total per acre, - - -	1	3	11	0	3	0
	Loads.	Bush.	Dec.	Load.	Bush.	Dec.
Total produce, - - -	31	0	0	24	3	0
per acre, - - -	5	—	18½	4	3	4
Medium value per load, -	1	17	6.	1	18	6.
Value per acre, - - -	10	11	6	9	0	4
Gain per acre in the produce, -	1	11	2	—	—	—
Ditto with the saving in seed, -	1	19	8½	—	—	—
Proportion of seed to product, -	1 to 15½			1 to 8½		

This experiment was rewarded by a premium by His Grace the Duke of Bedford.

Observations on the Row Culture.

Time of Sowing.—The celebrated Jethro Tull used to hoe his wheat in autumn, believing that this measure secured it from the severities of winter, &c. ; but the practice of drilling wheat after Michaelmas, generally renders autumnal hoeing impracticable.

This was even the case with a sandy field of fifteen acres, which was drilled with wheat at Liddington in the latter end of September, 1805. The wheat tillered

or

or branched considerably in the beginning of November, but the soil being rather poor, it did not rise sufficiently to admit the horse-hoe, and was in consequence nearly covered in the winter with May-weed, corn-poppies, golds (*Chrysanthemum Segetum*), and what is here called winter-weed (*Veronica hederæfoliis*, or ivy-leaved speedwell); and these may be reasonably presumed to have exhausted the soil during the winter as much as the wheat. Hence it appears, that if a farmer wishes a weedy soil to be kept clean in the winter, early drilling, as in the middle of September, may effect that purpose. Drilling of wheat sometimes retards the ripening of it from one to three days, but it is sometimes, as in the field above-mentioned, scarcely perceptible; yet as drilled wheat is sometimes more liable to mildew than the broad-cast, early sowing is in all probability an effectual remedy for this disease.

In opposition to this opinion, Mr. Foster, of Bedford, urges the want of leisure in September, and the occasional hardness and intractability of clay land clover-leys at that period; but as wheat is known to succeed well after drilled beans, the clover-ley may be sown with that crop with a good prospect of success.

I believe that none of the enemies of drilling in this county, nor even its advocates, have tried early sowing, with a view to prevent mildew, or destroy the winter growth of weeds in their infancy.

Quantity of Seed.—The practice of exhibiting the saving of seed, as one of the principal advantages attendant on the drill system, has proved fatal to its credit in numerous instances.

The quantities of seed mentioned by Mr. Smithies,
are

are as follow : wheat six pecks ; barley and oats eight to ten pecks ; beans or pease something less than twelve pecks.

On the other hand, Mr. Jennings, of Harlington, thinks that no seed ought to be saved by drilling, as he conceives that the effect of drilling, or rather of hoeing, is to enable a greater number of stalks to bear corn.

Mr. Clayton, who was many years a bailiff to the Duke of Bedford, thinks that seed cannot be saved without danger, especially on poor soils.

Mr. Smith, of Kimbolton, who is little in the practice of hoeing, is satisfied that seed may be saved by drilling barley. At Prisleigh farm, in Flitwick, barley was drilled after the rate of two bushels and a half per acre, in 1806, and according to the account of the bailiff, was much better than the broad-cast barley, though it was not hoed.

In the trials that have been made on the sands of Lidington, it has appeared that the drilling of a small quantity of seed is not without danger.

One field was drilled after the rate of about nine or ten pecks of pease per acre, and the produce was about 28 or 29 bushels per acre ; and it appeared there might have been more pease in some parts of the rows to advantage. In the last two or three years, three bushels per acre have been allowed, and even this quantity will be too little to ensure a crop, if the ground is not in a good state of tilth. Many of them will not grow in the most favourable circumstances ; they are liable to be destroyed by birds ; and in 1806, many pease were eaten by the slug or white snail, after having grown three or four inches tall.

In the experiment on wheat before-mentioned, little
more

more than seven pecks were drilled per acre; but in two subsequent trials, in fields of inferior fertility, two bushels per acre has appeared rather too little than too much, as causes which are little understood, are often seen to diminish the number of roots very considerably in winter.

Barley appears to require three bushels; two bushels have been tried on a poor sand at Liddington, without obtaining a full crop, and nearly four bushels in the same field in the present year, without much increasing the product of straw in this dry season.

Oats are seldom too thick on the ground; under this idea, four bushels per acre were drilled in 1806, with apparent benefit.

The want of direct experiments, is the cause of all the indecision in various parts of husbandry.

A majority of farmers, probably to the amount of one hundred to one, agree in the propriety of sowing the most seed on the poorest soils; but a few ingenious men have been found at all times to controvert the practice.

"A weak soil," they assert, "is injured by being loaded with a greater infant production than it can bring to maturity;" yet I imagine, a recurrence to the principles of vegetation, will be sufficient to prove that the common opinion is in this instance incontrovertible. The known characteristics of a poor soil are as follows: its crops are inferior to those on good soils, both in produce and value, and the manner in which this effect is produced, may be invariably seen in the inferior items of the account; as, the corns are smaller, and imperfectly filled; the ears (of wheat, &c.) are shorter, and contain fewer sets or rows of corn, and as the roots tiller less in the spring, the number of stalks

stalks exceed the number of roots in a smaller proportion than is the case on good ground.

I believe no doubt is entertained of the truth of the above assertions, abstractedly considered; and if that be the case, it is sufficient to decide the question; for if a greater number of roots be necessary to produce even a deficient crop on poor soils, than a good crop on those of greater fertility, it is evident a greater quantity of seed must be sown, and this quantity must be still further increased, to supply the loss of such as may die through weakness, want of root-hold, &c. in the winter. If any further arguments were needed, the case of turnips on rich and poor soils might be adduced. If the soil be rich, the greatest crop will be obtained by placing the turnips at considerable distances, to leave room for a vigorous growth; but if they be left very near together, they will smother the soil and themselves with a profusion of leaves, which will become bleached and sickly, and the roots will be very diminutive. In poor soils the case is immensely different: if the turnips are set out at a yard asunder, they will be small; increase the number fourfold, or set them eighteen inches a-part, and their size will be very little decreased; diminish their distance still farther to twelve inches, or leave nine in each yard instead of four, and the diminution of size will be still much over-balanced by the increase in number.

The case is apparently the same with every kind of vegetable.

Distance of Rows.—A gentleman asserted at one of the sheep shearings at Woburn, that he had grown forty bushels of beans per acre, in rows of three feet asunder; and the experiment has been tried in this

county with very ill success. The reason of this failure was, apparently, such as might be derived from the preceding remarks: viz. neither the soil nor the management was capable of producing plants of such a luxuriant growth as to fill the intervals. On the opposite, but much the safer side of the question, is Mr. Foster, who drills beans at intervals of only eleven inches and a half.

The common distance of the rows of dibbled beans is twenty inches, but where the soil is poor, and the management of the same character, there are some reasons to believe, that eighteen or even fifteen inch intervals are more likely to produce a full crop.

White corn is commonly drilled with nine-inch intervals, but whether this distance is preferable to six, seven, eight, or ten inch intervals, is not known in Bedfordshire, perhaps not in Great Britain.

The Rev. H. Y. Smithies drills barley at six inches and three quarters, and clover at the same distance, but it does not appear whether this distance is preferred on account of the barley, or the red clover, but the latter is most probable, from its comparative low growth.

J. W. Jennings, Esq. at Harlington, drills wheat and barley at eleven-inch intervals, and does not think it too great a distance; but one reason of the practice seems to have originated in the maker of the machine, who did not leave it a matter of choice.

In a field of wheat which was drilled with nine-inch intervals at Liddington, fair double rows were made with nine-inch intervals, and eighteen-inch alleys, without saving any seed by the omission of a few rows; but as these double rows appeared at harvest to contain little, if any, more wheat on account of the wide intervals, there seems to be some reason to conclude, that
larger

larger intervals than nine inches for white corn, are hazardous on poor soils, and appear to promise little profit on such as are more fertile.

Pease have been drilled at twelve, fifteen, and eighteen inches, and the latter distance is found to produce good crops in favourable seasons; but no experiments appear to have been made to prove which is the best distance.

Dibbling, or Bunching.—This mode of culture is chiefly restricted to beans in the central part of the county: it differs from drilling in two particulars; as, first, separate holes are made in a stiff soil to permit the insertion of the corn, and they are also equally useful in affording a passage upwards to the young shoots. But, secondly, the corn is set in bunches, which is supposed, if not proved, to be favourable to their growth. Opinions differ on the merits of setting corn in bunches, but the farmers generally permit their dibblers to put two, three, or four beans in each hole, because to set them singly would much increase the trouble and expense, and as such is the practice, it is accounted the best. Mr. Staines, formerly of Blunham, believes it best to set all the beans singly, and has obtained twelve or thirteen loads per acre, on two or three acres managed in that manner.

Mr. Whitbread, of Silsoe, has no doubt that beans grow best when dibbled four or five in a hole.

Mr. Lancaster, bailiff to Lord Carteret, wishes to have not less than two, nor more than three beans in each hole: some farmers, he observes, put six or seven in each hole, but he does not approve of it.

Wheat has been dibbled at Tingrith, but as it appears, chiefly with a view to save seed in dear times.

Mr. Horne, of Clophill, has introduced dibbling of wheat into that neighbourhood, having taken the idea from some friends in Suffolk.

It is dibbled two rows on each furrow, about five inches a-part each way, and four, five, six, and seven in a hole; and success seems to have extended the practice, after observing the effects of a single trial, as I observed another field in the same parish that was dibbled one row on each furrow. From the best observations I have been able to make, I think that crouding the roots of vegetables invariably promotes their growth in their young state. It is a common observation in this county, that young vegetables growing near together, *draw each other up*: but it is supposed by many, that they are proportionably deficient in strength and thickness, as their height exceeds that of single plants. Some minute examinations of rows of drilled corn, &c. have, however, tended to prove, that where the roots are most crouded, the bulk of each plant is increased by that circumstance.

In the experiment on drilling wheat, above recorded, some of the rows were injured by the birds in the winter, in consequence of its being sown late, and it was observed, that the thick patches grew higher than those parts which were injured by the birds; the blade was also stronger, and carried a deeper verdure, till late in the spring. Further than the voice of general opinion, there is no proof that the beneficial effects of crouding the roots extend to the period of maturity. But when people gain better crops than the broad-cast, by dibbling four or five corns of wheat, &c. in a hole, and that without any assistance from the hoe, it affords a strong presumption that such is the case.

But whatever benefit may accrue from crouding the roots

roots of plants, it is known that they may be too much crowded, and the subject certainly deserves that minute examination by direct experiments, which is not likely to be entered into except at the public expense.

Drilling is a means of crowding the roots of vegetables, and in order to make it more effectual for this purpose, the bottom of the drills should be so narrow as to make the corn lie, if possible, in a single row.

It does not appear in what manner one plant can receive a benefit by the growth of others near it, unless perhaps by the access of atmospheric air to the roots, which may be thus promoted; but on the first view of the subject, farmers seem to consider them as likely to rob each other of their proper nutriment.

Mr. Runciman, of Woburn, who is the most considerable driller in this neighbourhood, has had little success in drilling wheat, and approves of the drill almost entirely on account of the facility which it affords of destroying the innumerable weeds that infest his sandy soil. When this business is effected, Mr. R. hopes to gain a good crop of broad-cast wheat, from an opinion that drilled corn has farther to search for its food, and that it would grow better if set singly at equal distances.

Mr. Clayton approves of the scattered rows made by Duckett's drill, &c. for the same reason.

Mr. Agutter, of Salford, is a friend to drilling beans, &c. but has not tried white corn, from an expectation that such would produce many weak underling ears, and it may be here observed, that such is the *theory* of nearly all who have not tried this kind of husbandry, but which I believe is not realized in one instance in a hundred.

Depth of Drills.—Small seeds require but a slight covering of earth, and in an experiment on drilling turnips at Liddington, it appeared that there was much hazard of the growth of such as were covered three or four inches deep in the sand.

About two inches is esteemed a proper depth for most kinds of corn, but in most cases a minute attention to this circumstance seems of little importance. If the drill husbandry has no greater merits than that of affording a means of depositing the seed at a regular depth, it would probably be soon laid aside. Some have supposed that a uniformity of growth and regularity of ripening was promoted by these means, but the greater part of the broad-cast crops exhibit but little of these defects, even when the seed is deposited at all the various depths between half an inch and five inches.

Hand-hoeing and Horse-hoeing.—The discoveries which have tended to the benefit of the arts, and of mankind, have commonly resulted from the union of much labour and ingenuity; but the memorable discovery of modern agriculturists, that "hoeing is of little consequence, and sometimes injurious to the crop," is of another complexion, and has in all probability indolence for one of its parents, and prejudice for the other. Mr. Tull, the first inventor of a drill machine, entitled his first agricultural publication, "*The New Horse-hoeing Husbandry*," &c. He considered the drill merely as a means of permitting the use of the *horse-hoe*, and certainly never entertained a suspicion, that drilling without hoeing would ever meet with a solitary advocate.

But as the *horse-hoeing husbandry* has degenerated
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into *drilling*, it is necessary to remark, that there is an important distinction between those terms. The person who uses a drill, is a driller; but the use of the hoe, is indispensable in the *row culture*; and the cultivator who uses the drill without the hoe, is evidently a very incompetent judge of the merits of the hand-hoeing or horse-hoeing husbandry. The merits of what is properly called drilling, have been considered in the preceding pages; and though there appears a strong presumption, if not positive proof, that by crowding the seeds in some measure, and covering them with a well pulverized tilth, a small portion of the ordinary quantity may be saved, without injuring the crop, yet as it is thought that the weeds in the intervals will grow more rapidly than in broad-cast crops, the system of drilling, which extends no farther than sowing the corn in rows, is not likely to produce any public benefit.

With respect to the row culture, or the cultivation of the intervals of drilled corn, a minute investigation is necessary, and it is a subject of regret, that this county affords so few materials for that purpose.

The hand-hoe is generally used in cultivating the intervals of *set* beans, and it is remarkable, that the success that has in most instances attended the practice, has been the consequence of a single hoeing, which seldom penetrates the ground more than one inch, and in many places scarcely makes any impression. The horse-hoe is used by Mr. Foster, of Bedford, and the Rev. Mr. Smithies, of Little Staughton, on clay lands, levelled in the Suffolk manner; but Mr. Jennings, of Harlington, drills his beans across ridged lands, and they appeared this year to have been horse-hoed with tolerable regularity, notwithstanding the apparent difficulty of ridge and furrow work.

The white corn which has been hoed at all, has mostly had that operation performed by a horse-hoe, though it is sometimes done by hand labour.

In the experiment before mentioned, the wheat was hand-hoed three times, for the plants were so thin in some places, and the weeds so numerous, that a horse-hoe could not have been used without danger to the crop.

In hand-hoeing white corn with nine-inch intervals, a seven-inch hoe should be used. This will cost about 4s. per acre in light soils, which are nearly free from couch grass, and if a bushel per acre is saved in the drilling, it may be hoed twice, without being more expensive than a broad-cast crop. The hand-hoe is most effectual in extirpating young annual weeds; but the horse-hoe will more effectually root up bunches of couch grass, and is much the cheapest in its operation. The triangular hoes of the latter implement ought to be made seven inches wide, for nine-inch rows, and as the edges soon become rather blunted, they may even be made to press slightly against the rows of corn, without much danger of destroying it; but this circumstance occasionally prevents the destruction of some of the weeds that have obtained a strong root-hold, and therefore it must be granted to be occasionally inferior to hand labour in this intention. When the ground becomes hardened by drought or other causes, the horse-hoe obtains a striking superiority over the hand-hoe, as it will destroy the weeds and pulverize the soil, while the latter slides over the encrusted surface, and crops off some of the weeds by an operation which more resembles mowing a crop than cultivating the ground.

In certain seasons, the horse-hoe is incompetent to
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make any considerable impression on binding *roziny* soils, and some instances have come under observation, in which the horses' feet have done as much good as the hoe. If the crop fails under such circumstances, as it will if any seed has been saved in drilling, many will assert that the crop was lost by drilling, and this for want of distinguishing between saving the corn in rows, and cultivating the intervals when the corn has made its appearance. In such cases a proper arrangement of harrow tines should be substituted for the hoes, to break the incrustation of the surface soil.

The intention of hoeing is to destroy weeds; yet a gentleman in vindication of the broad-cast system, observed, that if the land was well fallowed, there would be few weeds among the crops. It is, however, a general opinion in this county, that much pulverization of the soil in the fallow season, increases the number of weeds, and is seldom known to destroy any except thistles, and the various couch grasses.

But, however free from weeds the land may be found immediately after a clean summer fallow, their increase is so rapid, in most cases, as to require a repetition of that process in a very few years. Now if a constant use of the hoe is capable of preventing this accumulation of weeds, the necessity of a naked fallow is much diminished, and the system is clearly productive of public as well as individual advantage.

Some observations on the most prevalent weeds may be seen in the Section devoted to that purpose; but there is scarcely a farmer who would deny, that many crops are half destroyed, in some seasons, under the best broad-cast management. The utility of a fallow is generally understood to consist in destroying of root-weeds and a portion of the annuals, which in the course
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of two, three, four, or five years' cultivation have so far increased, that no more crops can be ventured with a prospect of profit, as the superabundance of weeds would starve the crop, and finally, the occupier.

There is no doubt, therefore, that so far as weeds are destructive of the various crops, an uninterrupted use of the hand and horse hoe will promote their growth, and increase their value.

A farmer in the neighbourhood of Biggleswade, who has occasionally drilled some of his corn by borrowing a machine, advanced the opinion, that by drilling, three crops may be had in succession, with equal propriety as two in the broad-cast system, and this, it might be supposed, would be a strong argument in its favour; but the same gentleman believes, that the three crops thus obtained will not exceed the value of two good broad-cast crops, and therefore he seldom practises this mode of culture.

This singular opinion seems to rest on the supposition, that broad-cast crops are more productive than drilled ones in the proportion of three to two; but what attentive driller will venture to say, that this circumstance is within the bounds of probability?

A minute observer will also object to the supposition, that broad-cast crops are necessarily good ones, and will not permit the merits of this or any other system to be frittered away, by means of arguments of an accidental or temporary nature. It is not an unfair supposition, that such as have drilled but little have but a superficial acquaintance with the subject, and therefore ascribe the consequences of all their own errors to the inherent defects of the system. Instead of drilling to keep their land clean, they begin when it is too foul to bear any thing in the broad-cast mode.

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In addition to this fundamental error, they commonly add three or four more, as, they will use the same quantity of seed on weak, foul, exhausted land, where perhaps one-third of it will not vegetate, as an experienced driller would use on fertile land in a clean state of tilth. In such a case, the most effectual culture of the intervals may be insufficient to ensure a good crop. They should be horse-hoed repeatedly, but it is more than twenty to one if such an implement be at hand. The common hand-hoe will be therefore employed to destroy a few of the weeds, and those which remain will be sufficient to disgrace the drill husbandry—however unjustly—in the eyes of half the parish. A field of dibbled beans in this neighbourhood, appeared in many places completely swarded over with couch and other grasses: this was explained by a labourer who was on the spot, as a consequence of the field being hoed too early, and may serve to shew the want of energy with which the destruction of weeds among the corn is pursued in this county, even by those who are satisfied of the general advantages attending the row culture.

Few of the drillers appear to expect any other advantages from that husbandry than the destruction of weeds; but its more sanguine advocates anticipate the time when the use of the drill and horse-hoe shall render barren fallows unnecessary and useless. But I presume, before that event be accomplished, a great revolution must take place in the ideas of agriculturists; the implements must be made more effective, and applicable to general purposes; the experiments on drilling must be directed to prove particular points, rather than the general merits of a complicated system, and the public
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must not deem a large sum ill bestowed in the investigation.

Some of the most eminent agricultural writers have contended, that the use of fallowing consisted merely in destroying of the weeds, which it was conceived might be effected by hocking the pulse crops, and sowing the white-straw crops in the usual broad-cast manner; but the farmers of Bedfordshire, in common with those of other counties, believe that land is *exhausted* by cropping, and becomes renovated by *resting* in the fallow season. The idea that land requires *rest* like the bodies of animals, has been treated with ridicule rather than argument; it becomes necessary, therefore, to inquire, whether the opinion be not founded on the laws of Nature: but in this and numberless other cases, it is unfortunate that no experiments have been made with a view to that particular object.

The terms foul and exhausted, are often considered to possess nearly the same meaning, but they are certainly far from being synonymous terms.

A field whose surface is entirely covered with a fleece of weeds in the spring, after bearing three or four corn crops, may be said to be foul and exhausted. In this case it may be said in general terms; that it is exhausted by the corn that is carried away, and rendered foul by the weeds that remain. It may be supposed by some, that the weeds exhaust the land; but if they are ploughed into the ground in their succulent state, does it not rather receive a benefit from the green-crop manure?

On the whole, perhaps it may be found, that, in a strict sense of the word, exhaustion is not caused by the growth of weeds, however numerous they may appear on the soil.

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It seems to meet with a general concurrence of opinion, that in the ordinary course of husbandry, an alternate succession of corn crops, and leguminous or pulse crops, with fallows every three or four years, does not exhaust or impoverish the ground; but this is subject to some exceptions. On the woodland clays in the north of this county, the farmers are allowed, by lease or agreement, to sow three corn crops in succession after the fallow season; but many sow but two crops, and observe, that the land is too *weak* to bear the four years' course.

Mr. Pickering, of Harrold, is allowed to sow two corn crops in succession after clover, but thinks it a better system to take but one.

Mr. Smith, bailiff to the Duke of Manchester, at Kimbolton, makes it a rule to take but one corn crop after clover or seeds, on the cold and woodland clays of that neighbourhood; and asserts from experience, that good crops may be thus obtained from land that, a few years ago, was so far exhausted by successive corn crops, as to appear of little value.

Mr. Foster, of Bedford, coincides in the opinion, that land may be *exhausted*, though he is an advocate for the drill system. "The course of crops I adopt is the following: turnip-fallow, barley, red clover, wheat, and beans; though it must be observed, that it would be too *exhausting* except upon rich clays, or within reach of town dung, which latter is fortunately the case with me." Many other farmers concur in the opinion, that land is exhausted by over-cropping, and restored to its former vigour by fallowing; and such being the case, it is incumbent on the anti-fallowists to explain the reason, why the manure arising from 20 alternate white and green crops, is not equally competent

tent to maintain it in good heart, as if six or seven unproductive fallows had intervened.

Mr. Young has recorded, with due reprobation, the singular crop and fallow system of the *Roodings of Essex*; as also, that the farmers of that district depend on the fertilizing powers of *fallowing* more than manure.

This remark is here inserted, because the soil of that district appears, from the description of Mr. Young, to be similar to the wet, spongy, woodland clays of the north, and other hilly parts of Bedfordshire, where the proprietors have, in many instances, recommended the course of, fallow, barley, beans, and wheat; while the Essex farmers substitute a clean fallow in the place of the bean crop in this county.

But to return from this digression: there appears something which, in my opinion at least, amounts to demonstration, that the fertility of clay soils is much increased by fallowing, independent of the destruction of weeds, and the accession of manure.

The bodies of animals require the aid of rest or sleep, which supplies some unknown substance to recruit the vital powers, which cannot be obtained from food taken into the stomach.

Vegetables, in like manner, lose their irritability by exposure to heat and light; and the coolness of the nights affords them a kind of rest or sleep, by which their distended vessels collapse, and their vitality is renewed. And the resting of the soil, by letting it lie fallow, must be understood to mean the exposure of it to the atmosphere, from whence a continual accession of invisible manure is derived.

The nature and the quantity of manure that is derived from the air, is little known or attended to; but
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whatever may be its amount or value, it seems to afford the principal argument in favour of summer-fallows.

One very obvious source of fertility, which is derived through the medium of the air, consists in the smoke of houses, &c. which descends in the dews and rains; and though the effect of *sooting the soil* in this manner cannot be supposed to be very great, it visibly adds to the fertility of gardens, and other places in the vicinity of culinary fires. Fixed air, or carbonic acid gas, which exists in the air in the proportion of $\frac{1}{100}$ part of its substance, is a well-known support of vegetable growth, and is continually descending with the evening dews, and also by its own specific gravity. This kind of air is expelled from chalk in great quantities, when exposed to heat, as in lime-kilns, and is expelled from all vegetables when not exposed to light.

It has been proved by experiments, that the perspiration of vegetables will putrefy, which is a consequence of its containing a mucilaginous or other vegetable matter; and as it is said by Kirwan, that grasses and corn absorb and perspire about one half of their weight of water per day in fair weather, it may be supposed that the precipitation of this substance on the soil amounts to something considerable.

The perspiration of animals, and the evaporation of fixed air and volatile alkali from dunghills, must also be numbered among the substances which, being taken up into the air, form a common stock for recruiting the fertility of the soil without the aid of art.

Of the elementary principles of atmospheric air, the azote, or nitrogen, may be presumed to contribute to the production of all alkaline substances which are formed in the soil, or to increase their bulk; and it is
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known that alkalies contribute to the growth of vegetables.

The other constituent of atmospheric air, viz. oxygen gas, is rapidly absorbed by the soil, and, in conjunction with lime, potash, and other alkalies, forms nitre, and with coaly matters, forms carbonic acid. The former of these substances is a stimulant to the growth of vegetables, and the latter is essentially necessary to their existence.

The influence of the air in re-invigorating an exhausted soil in the fallow season, has been so little regarded by many writers, that it was thought necessary to consider the subject in this place, as much of the merits of the drilling, as well as the fallowing system, seem to depend on this circumstance.

This unobserved, but continual, precipitation of aërial manure, however trivial it may appear to some, is found capable of supplying the loss of the greatest part of the corn, butter, cheese, and animal flesh which is annually taken from a farm, without any thing being substituted in its place ; as also of the manure which is wasted in roads, ditches, &c. or is washed out of the soil by heavy rains. Its importance is therefore sufficiently obvious ; and the only remaining consideration seems to relate to the means of disposing the soil in the best manner to receive and retain it.

As the attraction of earthy substances is one of the means of separating from the air the substances which float in that element, a loose porous surface, such as is produced by hoeing, is evidently the most proper for that purpose ; as, if the surface be hard and baked, the air can penetrate but little, and the heat of the sun
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being exerted directly upon it, will cause every volatile particle to ascend into the air in the day, which was precipitated with the dews; &c. of the preceding night. Deep horse-hoeing is therefore obviously most effective in this intention, both in securing the depositions of the air from the heat and light, and in presenting a greater extent of surface to the air, by which they become united by attraction, as in the case of a summer-fallow. And when the ground is moist, a quantity of air is imprisoned in the earth, and is made to form combinations with the soil, and with the roots of growing vegetables, which would not otherwise have been formed.

In hoeing of sandy land at Lidlington; it has always appeared most effective when performed in a moist state; as, when the sand is perfectly dry, as deep as the hoe penetrates, it does not appear that much benefit, except by destroying weeds, can be thus obtained.

Clays that are disposed to be springy and moist, frequently exhibit a white saline efflorescence on the parts that are first dried by the wind in the spring; the same appearance may be often observed on sandy soils that have been long in a moist state. I have not been able to ascertain the acid that is thus formed, but the case of peat bogs in sandy districts is analogous, and seems to shew that it is the vitriolic; but whatever it may be, it proves that the air has an effect on soils in a state of moisture, which does not take place when they are dry.

The drillers who expect no advantage from hoeing, except that of destroying weeds, frequently neglect to hoe their barley, &c. under the idea that it does not require it; but if the foregoing arguments are of any weight, they may be presumed to prove, that the land

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may be hoed to advantage if there is scarcely a weed to be seen.

Lord Carteret's bailiff, though no advocate for drilling wheat, on account of the mildew, observed, on being asked the question, that there is no doubt of the power of hoeing to improve the growth of the corn, even if the land were perfectly free from weeds.

Of this opinion are several other drillers; and, in fact, there is no doubt attends it, except, as before-mentioned, on a poor loose sand which is parched with drought, below the reach of the hoe.

It is, indeed, so well established, that objections to the row culture are derived from this source. It is said to make the wheat rank, and therefore renders it liable to mildew; but to sow and hoe early, would probably prove a remedy for this misfortune, and, at all events, years of mildew must be considered as accidental rather than common occurrences. Mr. Smith, of Kimbolton, does not like to hoe barley, because it makes it tiller and ripen unequally; but this circumstance has never occurred in the barley drilled at Lidington.

The drilled barley has always shewn a superiority in the length of the ears, and fineness of sample.

In 1803, a maltster observed, that the drilled barley was worth 4s. per quarter more than the broad-cast in the same field; and the wheat, when ripe early, exhibits the same superiority.

Hand-weeding.—It was particularly recommended by the late and present Dukes of Bedford, to the candidates for the drill premium, to keep their drilled crops perfectly free from weeds; and a want of sufficient attention to this circumstance caused the premium to be

be withheld. Hand-weeding is little attended to by the drillers on sandy land ; and the merits of this practice, compared with its attendant expense, would seem to form a proper subject for an experiment, unencumbered with an attention to other circumstances.

To destroy weeds by hand-labour is a tedious and expensive process, and the farmers seldom attend to it, unless in cases where a handful may be extirpated at once. A hand-hoeing of 5s. per acre will suffice to extirpate at least ten times as many weeds as will be destroyed by hand at the same expense ; but as the weeds that grow in the drills are the most injurious to the corn, there is no doubt but a certain portion of them may be beneficially extirpated by hand.

If the weeds are numerous, the expense of 5s. or even 10s. per acre, will not be found sufficient to leave scarcely a foot in length of the drills entirely free from weeds ; and drilled corn on sandy land, will perhaps, after a very minute attention, remain more foul than stronger soils without any hand-weeding at all.

Miscellaneous Notes.—Mr. Pedley's servant, at Great Barford, observed that a former master, at Hail Weston, in Huntingdonshire, drilled pease, and obtained ten loads per acre, while his neighbours scarcely obtained five loads in the broad-cast manner.

Mr. Peacock, at Oakley, has seen drilled pease very inferior to the broad-cast ; but on this side of the question nothing can be proved, unless the management be explained. Drilled pease at Lidlington have produced on land in a good state, 40 bushels per acre, and under less favourable circumstances, as low as 20 ; and this year the green *aphis* fly has almost entirely ruined a promising crop ; but there is scarcely a doubt of the

merits of drilling pease in the whole of the sandy district, though there are many that neglect it for want of machines, &c.

The Rev. Selby Hele, of Colmworth, has drilled some beans, but the machine was laid aside: the thrasher observed, that the beans were well podded, but too few on the land.

Another farmer, in the north of the county, dibbled some beans, and turned some sheep into the field, *to hoe and hand-weed the crop*; but it proved too thin, as the sheep trod some of the beans to pieces, which, it seems, could not be spared.

It may be observed, that if a crop prove too thin, it is no reason why the row culture should be laid aside, as the remedy is so remarkably obvious that it cannot be mistaken.

At Harrold, the soil is mixed with round limestones; and the clayey part is so very gluey, when moist only with dew, that Mr. Pickering thinks it cannot be drilled with the common machines.

Mr. Golding, of Biddenham, sets beans in rows of 14 inches wide; they are hand-hoed at 6s. or 7s. per acre, and could not be horse-hoed, because of the stones which abound in the soil. They are this year (1806), says Mr. Golding, decidedly superior to the broad-cast.

Some beans are occasionally sprained in the furrow after the plough, and others by a dropper fixed between the plough-handles, which is turned by a wheel that runs on the unploughed soil. In this case, the straighter rows are made by directing the beans to that angle of the furrow that is made by the point of the share; but the beans that are thus trodden by the horses, are sometimes buried in a clung soil.

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The mode of cultivating beans adopted by Mr. Potts, of Eversholt, seems worthy of imitation by those who wish to save the expense of machines, &c.

The land is commonly cast or flattened for sowing of beans; but in this case it must be ridged up, and the furrows ploughed rather deep, and nine inches wide. When a sufficient quantity is ploughed, it must be sown broad-cast, and the surface of the land being entirely angular, the beans fall into as regular nine-inch rows as if they were drilled. It is important to harrow the land in the same day in which it is ploughed.

Mr. Young, at Hexton, in Hertfordshire, complained he could not use the drill, or double horse-plough, on account of the perversity of servants.

Lord Carteret's bailiff, at Hawnes, drills and dibbles at the desire of his Lordship, yet is very doubtful of its merits for wheat.

Mr. Whitbread's bailiff, at Southill, was absent; but I understood that some corn had been drilled, but none last year (1806).

The unsuccessful claimants of the Duke of Bedford's premium for drilling, were not sufficiently interested in the business to preserve an account of their experiments. Mr. Bricheno, of Biggleswade, has, however, preserved some account of a later experiment, but which was not delivered to the judges at the Duke's sheep-shearing of 1806. Five acres on one side of a field were drilled with barley in nine-inch rows, after the rate of three bushels to the acre, and five acres were sown after the rate of four bushels per acre. The produce of the broad-cast was five quarters, and of the drilled six quarters per acre, though the field was only hand-weeded.

A field of twenty acres was also sown and drilled

with wheat. Ten acres on one side of the field were dunged and folded, and sown with wheat, three bushels to the acre.

Ten acres on the other side were folded, and drilled at the rate of two bushels per acre, with nine-inch intervals.

The produce of the sown wheat was three loads per acre, and that of the drilled was five loads per acre.

The drilled wheat was not hoed, in consequence of the pressure of some other business, though Mr. Bricheno seldom omits that operation. The drilled barley succeeded white turnips, and the broad-cast succeeded the Swedish kind, though Mr. Bricheno has a plain proof that Swedish turnips are the best preparation for barley. The results of this experiment are very extraordinary, being in a great measure the contrary of what might have been predicted.

There are several other drillers in the neighbourhood of Biggleswade, but they appear to make no experiments. Mr. Dale, of Sutton, drills wheat across clay land ridges, and approves of drilling in general.

At Luton, the practice of drilling and dibbling makes no progress. A person in that parish drilled some wheat, as a preventative of wild oats; but those which remained in the rows, are said to have grown so luxuriantly, as to have supplied the deficiency of those which were destroyed by the hoe. This shews, however, the power of the hoe in promoting vegetation.

Mr. Jennings, of Harlington, who confesses a prejudice against drilling but lately subdued, had a field of drilled barley in 1806, of which but a small part was hoed, and this was three or four inches higher at harvest than the rest of the field, though much *hogweed*, &c. was left near the rows. This fact may
serve

serve to counterbalance the theoretical opinion, that hoeing lets the heat of the sun into the ground, and injures the crop.

In so intricate and complicated a subject as the row culture, it appears to me improper to regard the number of those who have practised the drill husbandry and have returned to the broad-cast, unless every step of the process be mentioned, in which I conceive it will commonly be found, that the management has been deficient in some essential point.

A deficiency of seed upon poor soils will be found ruinous to the crop, even under the best of management, and the hoeing, in such cases, has little power, in comparison to what are its known effects on richer soils.

If the soil is sufficiently rich to produce a luxuriant crop of wheat, drilling and hoeing might in this case make it rank, and more liable to mildew; but in such singular instances of exuberant fertility, whether natural, as in new broke soils, or acquired by a liberal allowance of manure, it is proper to sow beans rather than wheat in all cases. Hoeing the beans will in that case enable them to appropriate the fertility of the soil to themselves, instead of sharing it with the weeds, and the land will retain as much fertility as is useful for a subsequent crop of wheat.

SECT. III.—WEEDS.

THE destruction of weeds is one of the principal objects of attention in tilling the land, either by summer-fallows, or by the cultivation of corn in rows; but the best means of effecting this desirable object can only be learned from an elucidation of the habits of the various

kinds, and their prevalence on soils of various descriptions.

On this subject I can say but little, from a want of botanical knowledge, which is common among the cultivators of the soil; and I think it a subject of no less regret, that botanists are frequently led into mistakes of much consequence, from a deficient acquaintance with agriculture.

Light sandy Soils.

The most prevalent weed on sands, is the corn marigold (*chrysanthemum segetum*), called in the plural, *goolds*, in this county. Many acres of corn are almost destroyed by this weed. It abounds most in the sands that have not been sufficiently marled; but the marl without good tillage seems not sufficient to destroy it for many years. One fortunate circumstance attends this pernicious weed, as it is seldom or ever troublesome in winter corn, being incapable of enduring a frost of any continuance.

Stinking chamomile (*anthemis cotula*), or May-weed, is most common on the better kinds of sands, and gravelly and clay loams, and as it is capable of enduring the winter frosts, it sometimes utterly destroys the crops of wheat in such parts of the fields as are in other respects the most likely to produce luxuriant crops. Hand-weeding is supposed to be ineffectual in destroying this weed, and many other annuals, as the expense would be very great; and besides, it cannot be performed till the greater part of the mischief is already completed.

The corn-poppy (*papaver rhoeas*) seems less common on the sands than on the gravelly and loamy soils. It appears to be capable of resisting the effects of cold, as it is often very injurious to the crops of wheat.

Blue

Blue bottles (*centaurea cyanus*), are very injurious to wheat and other crops on light soils.

Common viper's bugloss (*echium vulgare*) is a very troublesome weed on some sands. It seems to affect peculiar spots that differ not apparently from other contiguous places where none is to be found. This is termed iron-weed in Bedfordshire.

Spurry (*spargula pentandria*), or beggar-weed, is an indubitable sign of great poverty in a sandy soil, and frequently covers the soil completely, where barley, &c. cannot be made to grow in a dry summer.

Bird's knot-grass (*polygonum aviculare*), or hog-weed, frequently abounds on sandy, gravelly, and loamy soils: this trailing weed is much relished by swine; it is an invariable inhabitant of path-sides, &c. and often may be seen to cover the soil entirely after harvest.

White goosefoot (*chenopodium album*), called in Bedfordshire, fathen, or wild spinage, abounds in many light soils, and from the strength of its stem and roots, may be presumed to do no little injury to the crops, as of turnips, &c. in which it is permitted to vegetate.

Fine tare (*erum tetraspermum*), and various species of the tare kind, are sometimes found injurious to the crops of light lands.

On some dry loamy soils are found considerable quantities of persicaria of different kinds, and climbing buck-wheat (*polygonum convolvulus*), or wheat vine.

Ivy-leaved speedwell (*veronica hederæfolia*), called winter-weed in this county, is common on the better kinds of sands and loamy soils, but it is a not unfrequent attendant of the wheat in most situations. Some farmers believe this weed does no injury to the wheat crop,

crop, from the circumstance of its ripening its seed very early in the spring; but this appears to me very incorrect reasoning.

Wheat has been supposed to exhaust the land more than other crops, from the circumstance of its continuing on the ground several months longer than other corn; but as the winter weed is sometimes as abundant on the ground as the wheat, during the winter months, there is reason to believe it has an equal share in exhausting it. Add to this the effect of its ripening its seeds, at which time vegetables depend almost entirely upon the soil, as their leaves are become incapable of absorbing much from the air. When a root of this weed is found at a distance from other weeds on a fallow, its branches will often extend nearly a foot in length, and as this is not the case in a wheat crop, it is obvious that the weed is starved by the wheat.

There are a variety of other annuals which infest the crops of corn on light soils; as, shepherd's purse (*thlapsi-bursa-pastoris*); whitlow grass (*draba verna*); soft dove's-foot crane's-bill (*geranium molle*); jagged-leaved crane's-bill (*geranium dissectum*); wild musk, as it is here termed, which is probably the burnet stork's-bill (*erodium pimpinella folium*); fumitory (*fumaria officinalis*); nettle hemp (*galeopsis tetrahit*); great napweed (*centaurea scabiosa*), or corn scabious; campior (*cucubalus*); corn horse-tail (*equisetum arvense*).

Rest-harrow (*ononis arvensis*), or cammock, is a perennial weed, and may be extirpated by good tillage. The thorny rest-harrow takes the name of gorse in this county, and is only found in poor pastures.

The various kinds of root-grasses which are known by the general name of couch, are common on the
light

light soils; but it is either not known or not generally attended to, that the creeping soft grass (*holcus mollis*), is by far the most common in such situations, and is known by the length and considerable thickness of its roots, and the soft woolly nature of its blueish green herbage. The Yorkshire grass (*holcus lanatus*) differs but little in its appearance, nor perhaps in its virtues, from *white twitch*, as it is here sometimes called; but it is not propagated by the root like the latter.

Chalky Soils.

The most pernicious weed of the chalky district, viz. the sheep's-fescue (*festuca ovina*), has been recommended by some botanical writers for the purpose of forming pasture. This forms in a great measure the natural sward of the chalky downs, and the arable land in the vicinity is frequently over-run with it, in the same manner as are the sands with the creeping soft grass before-mentioned.

This grass is not unfrequently met with in sandy and even clay soils, when their tillage is neglected; its roots, as well as its herbage, are small and wiry, frequently of a darkish colour; from which it has probably received the name of black twitch, in the central parts of this county. It is considered as more difficult to extirpate than the other kinds of couch-grass. In the chalky, as well as some clay soils, is found the red-flowering eye-bright (*euphrasia odontites*), several kinds of charlock, as rough-leaved charlock, or wild mustard (*sinapis nigra*); the smooth-leaved or wild rape, or navew (*brassica napus*), and the rough-leaved wild radish, with white flowers (*raphanus raphanistrum*).

Clay

Clay Soils.

The grass which is properly called couch, or creeping wheat-grass (*triticum repens*), is frequently met with on clays, as well as other soils. Its seed-spikes are much like the ray-grass; but they are rather square than flat, as is the case with the former.

A kind of couch-grass which seems peculiar to wet soils, is the creeping bent-grass (*agrostis stolonifera*), and is the same, I believe, as that called knot-grass in this county. The stem is of a reddish colour, which trails along the ground, and is capable of taking root at any of its numerous joints, if it touches a wet soil. It abounds in the furrows of wet clays, and is not easily destroyed. The corn foxtail, or mousetail (*alopecurus agrestis*) commonly called black-grass or land-grass in Bedfordshire, is extremely injurious to the crop in many instances, and appears to destroy the clover crop in the furrows of the land where it abounds. I conceive there cannot be a doubt that this plant is an annual, as however abundant on land in a state of tillage, I believe it cannot be found in any pasture.

It sheds such a number of seeds in the summer, that the wheat-stubbles sometimes become as green as a meadow soon after harvest; but its ill effects are not very considerable, except in particular instances.

Shepherd's-needle, or crow-needle (*scandix pecten*). These are sometimes very numerous in spring crops, as beans and oats. Some people assert that they are not disliked by horses, nor injurious to them.

The corn-crowfoot (*ranunculus arvensis*), is called the scratch-bur in this county. It is sometimes extremely

treminely injurious to crops of wheat, even after a good fallow.

Dodder, hell-weed, or devil's-guts (*cuscuta europea*), is called hale-weed, hair-weed, and beggar-weed, in this neighbourhood. It is in some seasons extremely injurious to the crop of beans or tares, and it is difficult to stop its progress, as it feeds on the corn, rather than depends as far as is known on a single root.

On the poorer kinds of light shallow stapled clays or woodlands, the wild oat (*avena fatua*) frequently makes its appearance, to the utter destruction of the crops. Some people think that frequent or deep ploughing, promotes their growth. Crows have been known to devour vast quantities of them, as they lay exposed on the ground after harvest. Another common plant on such soils is the wild parsnip (*pastinaca sylvestris*). But the weed that is probably more generally injurious than any other in such situations, is perhaps the sow-thistle (*sonchus oleraceus*), which frequently gives the corn of many parts of the north of Bedfordshire, and other hilly clays, an appearance as yellow and splendid, as is common in the sandy district, from the corn marygold.

A farmer in this neighbourhood, much of whose soil is of this description, observes, that in some parts of the land, the leaves of the sow-thistle absolutely touch each other, and destroy every blade of corn. Several other weeds are common on clay soils, as groundsel (*senecio vulgaris*); gromill (*lithospermum arvense*); chickweed (*alsine media*); coltsfoot (*tussilago farfara*); biting persicaria (*polygonum hydropiper*), or arse-smart; darnel (*lolium temulentum*); melilot (*trifolium melilotus officinalis*).

Cleaver's bedstraw (*galium aparine*), called pin-burs

burs in Bedfordshire; and cockle (*agrostemma githago*), are found in various situations, being frequently sown with the corn, as no sieve; unless the holes are made round instead of square, can separate them from wheat and barley.

The various kinds of thistles are found in most places, though they sometimes seem to affect particular spots. "It is an error to suppose that they are for the most part annual. Of the produce of Bedfordshire, we have three that are perennial, the corn thistle, the marsh thistle, and the stemless thistle. Two are biennial, the friar's crown, and the cotton thistle. All the others, viz. the nodding, the milky, the lanceolate, or spear-shaped, and the welted thistles, are annual."—*Dr. Abbot.*

The best means of destroying the various kinds of weeds are little known. A good fallow is expected to destroy the couch grasses, and a part of the thistles and other weeds, but the weed-hook and spud are the only resource of the farmer, for the purpose of thinning, rather than extirpating such as grow among the corn.

The practice of ploughing the clay fallows three times in the summer, will effectually destroy the root weeds, provided the weather be hot and dry during great part of the season; but if the weather be frequently wet, it will not unseldom leave some of the roots alive in the centre of the large clods, which the farmer fears to break, lest he let loose a host of annuals to destroy the succeeding crop of wheat. Such as sow wheat on the tilth are seldom found to be advocates for pulverizing the soil; they hope to imprison, rather than destroy the weeds, by making them vegetate, and so far as the wheat is concerned, the practice is right; but

but it tends rather to prove the impropriety of sowing wheat after a clean fallow, than the propriety of fallowing in that manner. If the design of a farmer, in making a summer-fallow, consists principally in an earnest endeavour to destroy the greatest possible quantity of perennial and annual weeds, the most likely method to effect this purpose, would seem to consist in ploughing the land immediately after harvest, and harrowing it as if for a crop of tares. By this means there will probably be found a plentiful crop of weeds, to be destroyed by the next ploughing in April; and if the land be again harrowed, another crop may be turned in within a few weeks, and also at various periods through the summer.

In the autumn there is no danger of too great pulverization, or of too many weeds, as the succeeding spring ploughing will destroy them, and convert them to green manure. With respect to keeping the corn crops free from weeds, the drill and hoe are the only resource. As to the Essex practice of hoeing broadcast wheat at an expense of from 10*s.* 6*d.* to 1*l.* 1*s.* 6*d.* per acre, it is unknown, and long may it be unknown in this county.

If corn ought to be hoed, it surely ought to be placed so as to admit a hoe of from six to nine inches wide, which will clear nearly all the ground, rather than a hoe of two or three inches wide, which scarcely mows half the surface at four times the expense.

SECT. IV.—FALLOWING.

THE operation of preparing the land for a course of crops, is the foundation of all good husbandry ; it is therefore not a little remarkable, that on a subject of such importance, the most opposite opinions are entertained by the distinguished writers of the present age. In the survey of East Lothian, summer-fallowing is mentioned as an important, and rather modern discovery in Scotland, and imported from England ; while on the other hand several English, and other writers, have strenuously maintained, that an unproductive fallow is unnecessary, useless, and even prejudicial.

That summer-fallows are unnecessary to the present extent, will be acknowledged by any consistent advocate of the drill husbandry, but the principles on which the row culture is founded, apparently preclude every supposition that naked fallows are in any case prejudicial, or even useless.

The farmers of Bedfordshire are well convinced of the utility of the system of summer-fallowing, and some of them pursue the old system of two corn crops and a fallow, even in the enclosures, where they possess a power of following their own inclinations. In these cases the land is commonly ploughed only three times : the first ploughing takes place in May, the second in June or July, and the third in August or September, and the manure is often laid on the land between the first and second ploughings. These ploughings have even their regular names : as the first is called *fallow*, the second *stirring*, and the third is called *laying up*, when the business is considered to be

be finished. Such is the common practice of all the occupiers of unenclosed clays; but those who fallow the land but seldom; find it conducive to their interest to plough more frequently, and even to harrow their foul land occasionally.

On the poor loose wet clays of Ravensden, Wil-den, &c. the farmers maintain that their land is best if ploughed but little when it is not foul; hence they frequently plough but twice previous to wheat sowing. Some of them maintain, that even were it ploughed but once in the summer, the wheat or barley would be more productive. They even prefer the trouble of destroying the thistles with hoes in the summer, rather than use that pernicious implement the plough! What a contrast is afforded by the eight or nine ploughings of Essex, with the two or three of the north of Bedfordshire.

The parishes here mentioned are in the state of open field, or it might be inquired what could be the object of fallowing land at all, if it is not to be done effectually without injuring the subsequent crops.

On similar loose and poor clays in Essex, it is said to be common to plough five or six times; and to fallow the land every second year, which is a circumstance worthy of the attention of those who have conceived any antipathy to the use of the plough.

Some particular instances have come under inspection, in which this unpropitious opinion of the use of ploughing has caused the land to become full of couch, and other weeds, while the farmer's purse became empty in the same proportion. The occupiers of better soils, and who sow wheat after the fallow, seem also in general to dislike the idea of pulverizing the soil, as it appears rather to increase than destroy

small weeds that infest the corn. Thistles and the various couch grasses compose nearly the whole of the weeds that a fallow is expected to destroy, and there is much reason to believe, that nothing but an uninterrupted and attentive practice of the row culture, can eradicate the rest.

Clay fallows should not be ploughed when very wet : but, says Mr. Long, of Stondon, they cannot be ploughed too often in the heat of a summer's sun.

Many farmers concur in opinion, that all the tillage of fallows intended for wheat, should be performed, if possible, as soon as the beginning of August, as the wheat is best put in upon an old tilth : but when the land contains any couch grasses, every good farmer uses all possible means of destroying them at any season of the year.

The benefit that land receives by exposure to the influence of the atmosphere, is little known or attended to, and consequently this county affords few advocates for ploughing the fallows in the autumn, though such is the common practice in various other districts. Some suppose that by winter ploughing, the land would become *chilled* and *perished* by the wet of winter, and plough worse the next spring than if it had not been stirred : but Mr. Golding, of Biddenham, observes, that laying the land too flat, or neglecting to let off the stagnant water, are the circumstances which bring the husbandry into disrepute ; to which also the paddling of sheep in winter, and the neglect of ploughing the land in the spring, before it is become too hard, may be supposed to contribute.

To enumerate the advocates of winter-fallows, is nearly similar to mentioning those who approve of the drill husbandry, as the latter will scarcely be opponents

nents of a practice which is highly conducive to their success. When beans are drilled, the land is ploughed at any time in the winter, when the weather will permit, and the land which is intended for fallow, is frequently ploughed in the autumn for tares, and consequently such as have tried either practice, are aware that no danger need in any case be apprehended.

In the section on Drilling, some remarks have been introduced, to prove in what manner hoeing the ground may tend to produce the same beneficial effects as result from summer-fallowing; yet as the theory of a noble author is in direct opposition to any supposition of benefit to be derived from the atmosphere, the success of the culture seems to depend, in some measure, on the elucidation of the manner in which the soil is improved by exposure to the air, pulverization, &c.

In the treatise on the Connexion between Agriculture and Chemistry, by the Earl of Dundonald, the ground is supposed to be injured by exposure to the air; as the oxygen, or acid part of the atmosphere, is absorbed by the soil, and combining with the vegetable matters, renders them less capable of being dissolved in water, and contributing to the support of vegetables.

Practical farmers have frequently remarked, that there is much danger in placing an implicit reliance on theoretical and speculative opinions; and on so important a subject as the consequences of summer-fallows, I conceive the first step should be, to ascertain the fact by direct experiment, after which it is probable that Chemistry may aid in explaining the process of Nature, and thus render an important service to Agriculture. At present, there appears such a weight of testimony in favour of clean fallows, as will cer-

Yet how can a good crop be obtained on a poor soil? The answer is obvious, and, I conceive, amounts to a proof, that fallowing *enriches* the soil, notwithstanding any ill effects that may be attributed to *oxygenation*, exhalation of volatile manure, &c. Mr. Young, in recommending a course of crops in which no dung was to be laid on the fallow, observes, that "the fallow will secure a good crop of barley." The anti-fallowists will grant that such could not be the case, if the sun or air was injurious to the soil. It is an important consideration to the scientific cultivator, that a certain quantity of corn, flesh, &c. is annually taken from the soil, without diminishing in the least degree its fertility. The weight of four loads of wheat is about 1200 lb. four quarters of barley weigh about 1696 lb. and 20 bushels of beans about 1300 lb.; and the weight of flesh which is produced by an acre of turnips or clover, is not less than 150 lb. Such quantities as these are annually carried away from almost every acre of land in Great Britain; and if water, air, light, and heat, contribute to injure rather than to renovate the soil, there does not appear to be any other agent in nature capable of being considered in that point of view. The oxygen, or acid part of the air, combines with manures, and all other inflammable substances, and there is little doubt but it contributes in some instances to render them less capable of being dissolved in water; but such is not invariably the case. Charcoal is known to form the basis of the vegetable fibres, and it is not known that water can take up any part of this substance until it is *oxygenated*, or turned to carbonic acid air. The nitrous acid was formerly supposed to exist in the air, and to contribute much to the fertility of the earth; and hence arose the prac-

tice of erecting walls of earth, mixed with alkaline and animal substances, to attract it from the atmosphere. The constituent principles of this acid form, indeed, the bulk of common air, though in an uncombined state; and as it is known to be highly conducive to fertility, in all its combinations with fixed and volatile alkalis and lime, there appears, to me at least, very strong reasons to expose the soil as much as possible in both winter and summer, to enable it to absorb and retain the carbonic and nitrous acids. The noble author before-mentioned includes gypsum and phosphate of lime among the insoluble salts, the former requiring upwards of 500 times its weight of water to dissolve it; but I conceive, that water will be found to dissolve as much of this substance as is required for the support of vegetation. Bones, which contain phosphate of lime, are apparently very insoluble; yet, owing to some process of Nature which is little understood, they contribute powerfully and speedily to enrich the soil. The weight of a common acre of corn may perhaps amount to three tons when dry, or nine in its succulent state; and as there appears reason to suppose, from the experiments of Dr. Hales, &c. that corn perspires about half its weight of water in a day in summer, it may be presumed that two tons of water evaporate, or pass through the vessels of each acre of growing corn, for 100 days of its growth, and consequently, every acre of corn might contain 8 cwt. of phosphate of lime, gypsum, carbon, or any other substance, though dissoluble in no less than 500 times its own weight of water. Vegetables lose two-thirds of their weight on being dried into hay; and even when apparently dry, they contain, according to M. Ruckert, about two-thirds of their weight of water in a solidified state.

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The real vegetable matter produced by an acre of ground appears, therefore, to be no more than 20 cwt. which, according to the above observations, might be supplied by the water which is absorbed by the corn during its growth, though consisting of substances which cannot be dissolved in less than 200 times their weight of water. Hence it appears, that it is not necessary that several kinds of vegetable nutriment should be easily dissolved in small quantities of water; it is even an established fact, that too strong doses of soot, urine, peat-ashes, &c. destroy instead of nourishing the vegetables to which they are applied. In the present season I observed part of a row of pease, which was entirely destroyed by the urine of a horse which was employed in hoeing the crop. The same cause is in other cases observed to make the corn grow very luxuriantly, and should serve as a caution to such as make small experiments, not to confound together the effects of the quantity with those of the quality of the substances employed.

The effects of summer-fallows on light soils, are known to be less beneficial than is the case on those of a strong nature, which are unfit for turnips; but it would not be easy to demonstrate that they are injurious, even to light sands, without the aid of experiments instituted for that purpose. It is rather a prevalent opinion, that sandy soils should not be stirred in dry hot weather; but they generally contain so much twitch, as no trifling quantity of attention is sufficient to destroy, and consequently receive more tillage than the clays in a great number of instances.

The learned Tull maintained, that light soils were consolidated, and by no means rendered lighter, by much tillage; this much, however, is well known,

that a sandy soil occupies more space previous to ploughing and harrowing, than when those operations have been performed.

If fallowing is injurious to any soil, this effect must be conspicuous on a poor sand; yet the tables of expenses and profits will render it apparent, that in the open-field rotation of fallow, rye, and pease, a crop of rye which is much below 35 bushels per acre, will not pay the expenses. Yet how can an operation which injures the land, enable a poor soil to produce so considerable a crop? When the soil consists almost entirely of sand, without any mixture of vegetable earth, it can receive little injury or benefit from the atmosphere, until it is well mixed with clay and manure, as there appears to be no substance to attract or retain any of the atmospheric depositions. In the better kind of red sands, the oxyde of iron seems to perform an important office in attracting the carbonic acid, and retaining the vegetable and other substances in connexion with the sand. The effect of light and heat upon the soil are not much understood; and it can only be supposed from analogy, that certain combinations and decompositions take place by means of their agency, which are never performed by cold and darkness. But whatever benefit may accrue to sandy soils by exposure to light, heat, and air, the production of cattle crops, such as turnips, prove infinitely more beneficial, and ought never to be omitted, as their broad and succulent leaves are peculiarly adapted to attract all the manures which float in the air, and to improve the soil, as well as the cattle which consume them in the place of their growth. It may be yet further observed on the atmospheric influence, that the least incrustation on the surface of the soil, is known by every turnip-hoeer to check the
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the growth of that vegetable ; and the good effects of hoeing are often conspicuous, where the soil was loose previous to that operation.

SECT. V.—COURSE OF CROPS.

PERHAPS no district in the kingdom affords a greater number of varieties in the succession of crops, than are to be met with in this county.

The tenant from year to year will scarcely be expected to look forward to a course of cropping, which may not terminate in less than ten or twelve years ; the irregularities which are often observed, are, therefore, not invariably attributable to the ignorance, perversity, or inconsistency of the occupier. The corn which it is thought will be most in demand, or which any local circumstance is likely to render more advantageous to the farmer, it may be expected he will sow in the greatest abundance. The size and number of fields on most farms of moderate extent, oppose obstacles in the way of theoretic regularity which are not easily removed ; and when it also happens that a farm is composed of clays and turnip soils, in unequal portions, the production of winter food on the latter, will probably contribute not a little to a similar result.

The usual course on the strong loamy and clayey soils, is thus described in the Original Report :

“ The common fields of those descriptions of soils, are commonly divided into three parts, seasons, or fields, one of which is annually fallowed, a moiety of which fallowed field (according to the best mode of management) is annually folded with sheep, and sowed with
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with wheat ; the other moi ty of such fallowed land is dunged, and sown with barley in the succeeding spring; and that part which produces wheat, is in succession sown with oats ; that which is next after fallow sown with barley, is in the succeeding year sowed with beans, pease, or other pulse ; and then such land being again to be fallowed, that part which, in the previous course of husbandry, was sown with wheat, comes in rotation to be sowed with barley ; by which procedures, the same kind or sort of grain is only produced every sixth year."

The course of husbandry above described, I have not found very scrupulously adhered to in any part of the county ; and as far as observation can be made, nearly two-thirds of the fallows are annually sown with wheat.

The propriety of this practice on weak thin-stapled clays is justly disputed ; but on the better kind of clays, a produce of from four to six or seven loads per acre of wheat, is held to be an argument in favour of the system, which is not easily overturned. The corn which succeeds the wheat or barley, is very generally of the pulse kind ; and though black oats, and all the varieties of white oats, are sometimes cultivated, the quantity is not very considerable.

At Sharubrook, I find the following course recommended :

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|---------------------|---------------------|
| 1. Fallow, | 4. Fallow, |
| 2. Wheat (folded), | 5. Barley (dunged), |
| 3. Pease and beans, | 6. Beans. |

The reason assigned for this variety of course is founded on the durability of the effect of dung. The fold, it is contended, though contributing more than any other kind of manure to bring the wheat crop to perfection,

perfection, becomes so far exhausted in the third year, as to be insufficient for the production of a crop of clean beans.

Clover is sown in some of the open clay-fields by common consent ; but in most cases, if a farmer choose to introduce this vegetable into the open fields, he finds it necessary to fence it out at a considerable expense.

When clover is sown in these circumstances, it is sometimes introduced instead of the *brach* or bean crop ; and after producing a quantity of valuable hay, or seed, remains for the support of the folding sheep in the spring of the fallow year. In other cases, clover has been sown with the bean crop as a substitute for a fallow, and sown after one ploughing with wheat, at the same time with the rest of the field, which had remained in the state of naked fallow.

A singular course prevails on two farms in the parish of Stotfold, viz. alternate crop and fallow.

The tilth is sown with wheat and barley ; to these succeed tares or clover, which are provided for the consumption of folding sheep, &c. in the spring of the fallow season. This succession of a single crop and fallow has prevailed a great many years, and appears to have been adopted in consequence of the land being situated in only two fields, and not from any high opinion that was entertained of the merits of the practice. The operation of fallowing is, in these circumstances, incapable of successfully cleaning land which is foul ; but the quick repetition of summer tillage is probably competent to prevent any great accumulation of weeds.

What is called a fallow, it may be observed, is with nearly equal propriety a green crop, which may be said to receive either a late fallowing, according to the usual acceptation of that term, or what would be called
temper-

tempering in Norfolk, or an early and repeated ploughing of clover-ley previous to the season of wheat-sowing.

That part of the fallows which produces no spring feed for the sheep, ought to bear a good crop, if the farmer expects to gain a fair profit under the present expenses of cultivating the soil.

In the unenclosed parishes of the sandy district, much of the soil receives, every third year, a complete summer-fallow, previous to a crop of rye, wheat, or barley; the former being chiefly depended upon in such hilly and dry soils as have not received an ample dressing of marl, or farm-yard manure. The second crop is generally oats; pease, however, are sometimes sown, but the comparative infrequency of their appearance will warrant the inference, that oats are a less uncertain or more valuable crop, on a general average of years.

Turnips are sometimes cultivated, both on the sands and gravels, by mutual consent, and frequently with good success. Clover, also, occasionally contributes to relieve the fields from the exhausting effects of an almost uniform succession of white-straw crops; and has been sometimes permitted to remain unstirred in the fallow year, to be sown, after once ploughing, with wheat, according to the most approved practice of the enclosures.

Mr. Platt, of Lidlington, approves of the following course on light soils :

1. Fallow and turnips;
2. Barley or oats, with grass-seeds, sown at the same time as the corn;
3. Grass-seeds, fed on light soils, but mown once on clays;
4. Grass-

4. Grass-seeds, sown on light soils: if on clays, plough deep, and sow with wheat or beans;
5. } Wheat or pease, the one succeeding the other.
6. }

If drilling is intended, either pease or beans ought to succeed the clover.

If the succession of crops present any circumstances worthy of the attention of the enlightened cultivator—to the occupier of enclosures (where the demands of the tithe-owner or landlord are never heard) must we seek for information.

I was favoured with the following remarks on the proper course of crops to be pursued on clay soils, by J. Foster, Esq. of Bedford, a gentleman whose attachment to agriculture is, fortunately for the science, curbed by no motives of domestic prudence, nor manacled by the interference of any discordant interests.

“ The course of crops which I adopt, is the following; though it must be observed, that it would be *too exhausting*, except upon rich clays, or within the reach of town dung, which latter is fortunately the case with me. Preparatory to the turnip-fallow, in the end of autumn or during winter, I plough up the land into ridges, in order to lie as dry as possible, and to take the grass and other foulness out of the furrows, which is otherwise never effectually done. The latter frosts then have a great effect in mollifying and pulverizing the soil; and if this can be attained, I have found, that what has been stirred in February is less raw and livery within than such as, having been opened in December, has imbibed the whole winter's wet. The second ploughing should not take place till the ground becomes dry within; otherwise the plough will work out

near

near the surface, and the soil below will, instead of being brought up, be trampled and saddened.

“About the middle of April, when barley-sowing is done, will be the time for the second ploughing, when the land should be *cast*. After lying two or three weeks, I break the clods with the cast-iron, fluted, or drill roller, and work it with the scuffle length and crosswise; then give it rest again for a week or two, till the annual weeds are vegetated. To this, one or two cross-ploughings succeed, with scuffling between, which will reduce it to a state fit for dunging. Should there be twitch after the senffling, a harrow may be applied, and the roots gathered off and burnt; but I now seldom find occasion for this; and harrowing, if needless, is as well avoided in our strong soil, as it tends to sadden it. In dunging, I made trial of the Scotch mode of laying the manure under the turnips; but have discontinued it, not finding our workmen equal to the nicety with which it should be performed; also in the idea, that for the following crops, the dung and earth did not become duly mixed. I make it a point to have the dung spread as fine as possible, to avoid its afterwards working to the surface; also, to let the plough immediately follow the spreading, to prevent its evaporation. In this state it waits till the first rains in July, when it is ploughed into straight lands, adapted to six rows of turnips 18 inches a-part, and after harrowing, the seed is immediately drilled in. To prevent vacancies, it may be useful to pass the drill twice over each place, and even then, a pound of seed will sow an acre. Harrowing turnips, and all other seed, is performed by three harrows, of breadth adapted to the lands, which are drawn by two horses walking in the furrows, by which means treading the finished work is avoided.

“When

“ When the turnips are of a proper size, they are hand-hoed in the rows, without much regard to the intervening space, as the horse-hoe is sure to clear this. As soon as the plants are of such size that the leaves nearly meet across the rows, a horse passing between each row draws the expanding horse-hoe through them, which not only clears all weeds, but, by moulding up the turnips, both nourishes and protects them against the winter frosts. After this, they will need no farther trouble, except a few garlies, sow-thistles, or other tall weeds should appear, which are easily chopped off with a hoe. As soon as the turnips are off the ground, I would plough up for barley. If this can be effected so soon that frosts may intervene between the ploughing and sowing, it will drill in perfection; but in other circumstances, harrowing in, or scuffling, may be needful. The turnips having been carted off, the barley crop cannot be expected to be so heavy as if the soil had permitted their being fed off; but the same cause will encourage the clover plant, by preventing its being smothered by the corn with which it is sown. I do not apprehend that the carting of the turnips is injurious to any crop, except the one immediately following them.

“ When the barley is off the ground, I do not suffer sheep, or any other stock, to pasture upon the stubble, either in the autumn or spring, in the idea, that the clover remaining on the ground both protects the roots from the winter frosts, and is some manure.

“ From the beginning to the middle of June, I mow the clover, let it lie three or four days, then turn it once, and leave it the same length of time.

“ Should the weather be fine, moving it more would
only

only cause loss of leaf; but if it be showery, it may require turning once or twice more. My method then is, to put it up in large well-shaped cocks, like those made in the North of England; not of the size of pike-cocks, but about four or six to a cart-load. Hay or clover, in this state, will then safely wait till the whole quantity is ready for stacking. This appears to me more eligible than forming the stack as the materials become ready. Rain will be very injurious to an unfinished stack, unless, indeed, amply covered with a sail-cloth, with which few are provided; whereas I have never known the cocks out of doors sustain considerable harm from any quantity of wet, however heavy or lasting.

“There are, besides, other advantages of cocking. If an unexpected rain should approach, which those who are attentive to the barometer, and appearances of the weather, will not fail to foresee, a company of hay-makers will in an hour cock several acres of hay or clover; whereas there would be no time to make any progress in housing; or if the stack was begun, the injury would be only the greater. This mode is also a certain preventative against stacks firing; while, if the hay be in good order, and not too dry, a due heat will not fail to take place in the stack.

“Some loads of stubble should be in preparation, to thatch the stack as soon as it is sufficiently settled, from the want of which provision, damage has often been sustained. Upon the whole it may be observed, that hay-making is more carefully and expertly practised in the northern and western counties, than in most of the midland, and no where worse than in Bedfordshire. If we were as subject to rains as they are in Lancashire

shire and Cheshire, farmers would find it needful to adopt a different mode from the careless one here practised.

“ The second crop of clover is either mowed for hay, or kept for seed. The latter has hereabouts sometimes cleared from 12*l.* to 14*l.* per acre; but 4*l.* 10*s.* or 5*l.* will perhaps be a more common profit; but considering the disappointments by weather and maggots, or the total loss that is often experienced, perhaps those who pasture or mow the second growth of clover, will act as prudently; besides that the seed often remains upon the ground so long as to impede the wheat sowing.

“ I always put in wheat after clover; dung or folding would be useful between, but here often the resources fail. If the ley, when turned up, will harrow fine, drilling will be sure to succeed; but I have had very faulty crops by attempting it, when there has not been a sufficiency of rain to dissolve the clods. If after rain the ground is still stiff and streaky, dibbling is the only mode that will quite ensure a good plant. It appears to me to be very material to us to have all the clover-ley wheat sown by the 20th of October, otherwise the crows and the winter may destroy so much, that scarcely half a crop will remain; and this will seldom escape the mildew. After wheat, I take a crop of beans. If but one ploughing between them is intended, it seems to me to be best done in February. There are sure to follow frosts enough to mellow the ground for drilling the beans in the course of March, and it will be less raw within, and less grassy, than if ploughed in November or December. But I have also tried ploughing once in October or November, and again in February, with good success.

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“ Many think that fourteen or eighteen inches is a proper distance between the bean-rows, but I rather prefer twelve, or even nine inches, having found that they still will kid well, and by being thick, will smother the weeds, and leave the ground perfectly clean and mellow. The drill horse-hoes will work very effectually between these narrow rows, and much subsequent hand-weeding will not be necessary; though, should some few weeds spring up, after the beans are too large for the horse-hoe, a little hand-labour will be well bestowed, and save their seeding. Beans, though the last crop, still have in this way succeeded admirably, bearing as much as fifty bushels, and even more per acre, besides a vast quantity of valuable straw.

“ The most of our brown clays, however, would *not be equal* to this course of crops, without artificial or town manure. Pasturing red clover with sheep for a year, has been found in itself useful, and a fit preparation for wheat. A good course would be,

- | | |
|-----------------------|---------------------|
| 1. Summer fallow, | 3. Clover eat off, |
| 2. Wheat, | 4. Wheat, or beans; |
| Or, 1. Turnip fallow, | 4. Wheat, |
| 2. Barley, | 5. Beans. |
| 3. Clover eat off, | |

“ Some have sown red clover and rye-grass for two years, with good effect.”—*J. Foster, Esq.*

The course of crops, and general system of husbandry pursued by the Rev. H. Y. Smithies, of Little Staughton (who is, I believe, a native of Suffolk), possesses many points of similarity to that above described; but I believe it is not adopted at present by any native of this county.

On

On the cold clays north of Bedford, many entertain an opinion that wheat succeeds much better after beans than red clover; and the favourite course in the enclosed parishes of Knotting, Souldrop, Melshbourn, Risely, Felmersham, &c. is a four-shift, viz. 1. fallow; 2. barley; 3. beans; 4. wheat, with occasional varieties of red clover, which though not often sown, is said to be very liable to fail. Clover-wheat is however often met with in this angle of the county, on soils of all descriptions; and the four-shift of fallow, barley, clover, wheat, is practised on all the mild and dry species of clays in every part of the county.

On the better kinds of heavy soils, some of the most common rotations are as follow :

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|----------------------|---------------------|
| 1. Fallow, | 3. Red clover, |
| 2. Wheat, or barley, | 4. Wheat, or beans. |

To these sometimes is added a crop of oats, or the oats are sown in the second or fourth year.

One or two instances have occurred, of red clover being sown repeatedly, without the intervention of a fallow; as, fallow, wheat, clover, wheat, clover, wheat.

Hasty repetitions of clover or wheat, is a system that receives as little praise in this county as in most others, and where it occurs frequently, will probably bring to mind the fable of the goose which laid eggs of gold. It does not appear, however, that a short-sighted avarice is a ruling passion among the farmers of enclosed clays. They have frequently observed, in answer to inquiries of the course of crops: "We are allowed to take three successive crops of corn; but two good ones are often more advantageous, on the whole."—"Our land,"

some of them observe, "is too weak to bear three crops, even if one of them be clover."

Mr. Pickering, of Harrold, who has a lease, is allowed to take three corn crops, one of which precedes, and two follow clover; but he thinks, if a tenant never takes two successive crops of corn, he will find it most profitable in a term of years. A great number of farmers remain in various parts of the county, who under no restrictions but what originate in their own sentiments, and having every means of information within their reach, still pursue the old open-field rotation of two crops and a fallow, with no other variations than tares on a part of the fallow, and clover perhaps once in nine years, on a part of the bean or oat-stubble, - or more commonly instead of those second crops. Some of them stoutly maintain that clay soils cannot be kept clean by any other means. And that it may not be deemed, as it probably would, that such opinions prevail only among small occupiers, it may be proper to say, that such is the practice of a considerable farmer who occupies his own estate, and of another who keeps, I believe, twelve or thirteen horses, and has been a farmer considerably more than half a century.

Perhaps a just inference drawn from the opposite opinions entertained on this subject, might warrant a conclusion, that the disadvantages of old customs have been much magnified, while some of the advantages of new ones have not proved substantial. At any rate, those who (strictly speaking), have never tried the drill-husbandry, which comprises nine-tenths of the farmers in this county, will not be deemed competent judges how far that system may be capable of preserving the land
from

from becoming foul, whatever may be the case under their own broad-cast management.

The rotations of crops on the gravels, sands, and loams on a chalky basis, consist in general of a turnip fallow, succeeded by barley, and the various kinds of clover, &c. At Potton, and other sands in that neighbourhood, where the common course of, turnips, barley, red clover, wheat, &c. has prevailed, they frequently substitute pease for the clover, as the land is tired of the latter. On the gravels of Cardington, Willington, &c. I found the following courses :

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|--------------------------|--------------------|
| 1. Turnips, | 4. Wheat, |
| 2. Barley, | 5. Pease, or oats. |
| 3. Red clover, or pease, | |

Oats are here frequently sown after the wheat, as the pea crop is very liable to fail, and sometimes a mixture of oats and pease.

Mr. Thompson, of Sundon, on a chalky subsoil is in nearly the same course, viz.

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| 1. Turnips, |
| 2. Barley, |
| 3. Red clover, and other weeds alternately, |
| 4. Wheat, |
| 5. Pease, or oats. |

Mr. Gresham, of Chicksands, sometimes sows pease instead of clover ; but he says the light sands will not bear three corn crops without purchased manures.

Mr. Humberstone, and others, on the gravels of Southill, prefer to sow clover with pease. The course is,

- | | |
|-------------|----------------|
| 1. Turnips, | 4. Red clover, |
| 2. Barley, | 5. Wheat. |
| 3. Pease, | |

At Warden many sow oats after wheat. Lord Ongley however does not; yet his Lordship's disapprobation of the practice is not sufficient to induce him to restrict his tenants from it.

Barley seems rather a favourite crop towards Biggleswade, and is frequently sown after wheat, &c.

At Dunstable I find the following singular course:

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|-------------|----------------|
| 1. Turnips, | 4. Red clover, |
| 2. Barley, | 5. Wheat, |
| 3. Barley, | 6. Oats. |

This arrangement betrays no abhorrence of white straw crops, but is contrived, apparently, to set all the speculations of agricultural theorists at defiance; and as it is neither the offspring of ignorance nor poverty, it seems proper to adduce the reasons which have been urged in its defence. The great quantity of London and other manure, which is here used, causes the barley, it is affirmed, to grow too luxuriantly to make it prudent to venture the clover to be sown in the first season. The barley is therefore repeated for that purpose, with better success.

Oats are sown after wheat, for the same reason that is given in all similar cases, viz. because a fair produce can be thus procured, which in a pea crop they conceive is far more hazardous.

It is also believed that clover is less liable to fail in this rotation, as it occurs but once in six years. The usual rotations on the sands of Woburn, Lidlington, &c. have been,

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|------------------------|---------------------------|
| 1. Turnips, | 4. Red clover, sheep fed, |
| 2. Barley, | 5. Wheat, |
| 3. Red clover and rye- | 6. Pease. |
| grass mown, | |

Sometimes

Sometimes barley and oats have severally preceded the clover, which has been followed by a single crop of wheat, rye, or oats. But of late, white clover and trefoil are frequently sown with the other seeds, and apparently to much advantage. Mr. Platt, of Liddington, sows ray-grass with red and white clover, which, after being sheep-fed two years, is followed by wheat and pease. The advocates of drilling are under little apprehension of exhausting the land by an extra crop of corn, which is kept free from weeds. Two or three corn crops are sometimes taken under this system, on light soils, previous to a crop of clover, without any ill consequences.

The bailiffs, however, of the Duke of Bedford and the Duke of Manchester, at Prisleigh farm, and at Kimbolton, who are natives of Northumberland, retain the ideas which appear to be prevalent in that district, viz. that folding of sheep, otherwise than by feeding the seeds, is useless in an agricultural view, and injurious to the sheep; that *corn* crops ought never to succeed each other; and that oats should be sown after grass, and other mixed seeds, in preference to wheat. Oats have been sown after ray-grass, clover, &c. in various parts of the county, and many are of opinion, that whenever land, particularly the heavy kind, is laid to seeds for two or more years, wheat is a very uncertain crop. Wheat has, however, been frequently sown in such cases, and its ill success has induced many to believe that ray-grass is an exhausting plant. It is (they assert) an enemy to wheat, and it fouls, saddens and impoverishes the soil.

If clay soils (according to the opinion of Mr. Smith, of Kimbolton, and others) ought to be sown with the

various clovers and ray-grass, and sheep-fed without folding for two or more years, the course may be,

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|-------------|-------------|
| 1. Fallow, | 4. Grasses, |
| 2. Wheat, | 5. Oats. |
| 3. Grasses, | |

- | | |
|----------------|-------------|
| Or, 1. Fallow, | 4. Grasses, |
| 2. Barley, | 5. Beans, |
| 3. Grasses, | 6. Wheat. |

In lighter soils, pease will of course be substituted for beans.

The following abstract of the crops of certain tenants of the late Duke of Bedford, is extracted from Mr. Young's *Annals*, vol. xxxvii. p. 347. This document furnishes the means of ascertaining the average size of His Grace's farms in the parishes concerned. The number of farms must be stated at 58, as three are occupied by His Grace.

The average size of the farms appears to be about 144 acres; and this is probably not much below the average of the county. About two-fifths of the old pasture land appears to be annually mowed; from which it appears, that a considerable portion is fed with sheep, and other cattle that require no hay in the winter.

An Abstract of the Crops produced in the Years 1795 to 1800, on the Estates belonging to His Grace the Duke of Bedford, under the care of John Farquhar, in the several Parishes of Amptwell, Aspley, Crawley, Eversholt, Fitzwilliam, Houghton, Kensington, and Wotton Regis, Luton, Moulden, Milton Bryan, Potsgrove, Ridgmont, Steppingley, Totternhoe, Tuggerthorpe, Tuddington, and Woburn, in the County of Bedford, and Warendon, in the County of Bucks, in the occupation of His Grace on 1st February of his Tenants, not including the Woods, Parks, Water Meadows, Plantations, or Furze Grounds, in His Grace's own hands, or single Closes, left with Houses, Shops, &c.

Produce of the Land.	1795.		1796.		1797.		1798.		1799.		1800.	
	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.	Acr. 10th.
Wheat,	591	5 872	5 657	7 763	1 852	8 882	6					
Barley,	437	8 646	6 696	5 701	3 692	3 610	7					
Oats,	527	3 969	1 471	9 398	2 407	7 494	9					
Pease,	108	2 125	2 195	9 189	1 141	9 91	0					
Beans,	381	1 247	4 214	1 539	7 261	9 155	3					
Rye,	137	9 196	6 86	2 73	8 53	1 101	4					
Potatoes (exclusive of gardens),	3	0 3	0 1	7 1	0 3	8 13	6					
Beans and pease, mixed,	196	8 150	7 126	7 93	4 118	4 130	8					
Vetches, or tares,	19	5 54	0 286	0 142	0 178	7 95	7					
Cole,	23	1	—	—	14	7 55	6					
Turnips,	392	8 401	3 386	8 441	9 408	9 478	9					
Fallow (without a green crop),	973	3 723	1 747	2 577	0 596	8 593	7					
Clover, sainfoin, and rye-grass (grazed),	431	8 364	9 392	1 405	6 490	3 493	6					
Ditto (mowed),	153	1 170	0 162	6 473	0 368	7 523	4					
Old pasture land (grazed),	1897	4 1963	4 1944	5 1857	5 1843	0 1928	7					
Ditto (mowed),	1907	9 1301	7 1274	2 1403	1 1386	5 1244	7					
Spinneys, small plantations, or land (generally waste and unfit for cultivation) intended to be planted, sheep-walks, &c.	618	2 591	5 535	8 444	9 424	2 382	9					
Honesteads, yards, gardens, &c.	61	7 61	7 61	7 61	7 61	2 61	5					
	8363	4 8973	4 8963	4 8966	5 8314	9 8341	0					

The variation in the total quantity of different years, arises from small purchases of land made in the interval.

J. FA REX.

Woburn, November 26, 1800.

The course of crops which is most proper in various soils and situations, is a subject of much uncertainty, and will never receive a satisfactory discussion, until the characteristic distinctions of various kinds of cultivated vegetables are thoroughly investigated.

The principal distinction of plants, respects the form of their roots. The kinds which are believed to exhaust the soil of its vegetable nourishment in the most rapid manner, put forth a great number of small fibrous roots, which pierce the cultivated earth in every direction. This class includes wheat, rye, barley, and oats, as also rye-grass, and all the natural pasture grasses; yet the grasses are less exhausting than corn, because of their diminutive bulk, but principally because they are not suffered to ripen their seeds, and are wholly consumed, either in winter or summer on the ground which produced them. The plants which are said to ameliorate or improve the soil, generally strike their roots deep into the ground, and frequently several inches below the part that is moved by the plough. These are called tap-rooted vegetables, the principal of which are beans, pease, tares, sainfoin, lucerne, the different kinds of trefoil or clover, carrots, parsnips, cole-seed, cabbages, and turnips. It is observed in another place, that all vegetables exhaust the soil whence they derive their nourishment, and that they differ only in degree.

The tap-rooted plants are universally allowed to exhaust the fertility of the earth in a small degree, in comparison to the white-strawed crops, and this circumstance is known to result, in a great measure, from the juicy nature of their leaves and stems, which are calculated to absorb a great portion of their nutriment from the atmosphere. It is evident, however, that their

their success depends in a great measure on the fertility of the soil, as this circumstance is necessary to enable them to receive and digest the aerial manure. Moisture is also an essential principle of their support, and hence appears the reason, why pease and red clover are almost sure to fail on sands that contain very little clay to retain the moisture; and also, why red clover often grows so luxuriantly in a wet season, as to destroy the crops of barley. On the other hand, sainfoin requires but little moisture for its support, as its roots extend among the fissures of the chalky subsoil beyond the reach of the heat of summer. They have been traced many yards deep in some chalk-pits towards Luton. It may be observed in general, of what are termed ameliorating crops, that they thrive most on soils which possess some degree of porosity, to a considerable depth. Every shower of rain which falls on a porous soil, carries some portion of the vegetable substance below the reach of the plough; the utility of the tap-rooted plants, consists therefore, in their power of penetrating into the subsoil, and absorbing the manure which has made its escape below the cultivated tilth, and would be of no utility to white-strawed corn crops.

Wheat, barley, &c. sometimes receive but little injury in the neighbourhood of trees, while a crop of turnips in such a situation will appear absolutely starved by the roots of oaks and other trees, though they lie so deep as not to be discovered by the plough.

The utility of manure in the growth of turnips is evident, yet I have seen the most indubitable proofs that any poor, light sand, will produce better turnips than can be produced on a soil penetrated with tree roots,

roots, even by the aid of an ample allowance of manure.

Thin stapled clays, which often consist of a loose tilth, and a tough yellow, or sometimes blue substratum, may be supposed unfriendly to the growth of tap-rooted plants; and such is actually the case, as on some of them it is said neither beans, pease, tares, nor red clover, can be cultivated with much success. On this kind of soil, as well as on light blowing sands, red clover is less successful than the other kinds whose tap-roots are not so large.

The better parts of warrens are generally shewn by the growth of fern, the roots of which penetrate commonly about a yard deep. They are filled with a mucilaginous liquor, which shews that the supports of vegetation are found at that depth below the surface, while the white and grey sands produce nothing but ling (*crica vulgaris*), whose hard substance can scarcely be made to putrefy, while the sand that supports them seems to possess no principle of cohesion, or power of attracting or retaining any of the depositions of the air.

The exhausting, or white straw crops, if frequently repeated, are said to injure the ground for many years. They are in general the most profitable crops for the purpose of producing a quick return of money to the farmer, and are therefore sown in an improper proportion whenever a consolidation of farms, or extravagant rise of rents, is in prospect. The immediate profit of ameliorating crops is seldom very considerable, as a part of it is left in the soil: the growth of these will be promoted by leases, or any other means that promise a permanence of occupation. The frequent growth of turnips, clover, trefoil, ray-grass, tares

tares, &c. cannot fail to promote the fertility of any soil whatever; they are also beneficial to the farmer who remains, but not to such as are to leave their farms. It was formerly believed, that various species of plants extract the food which most suits their own nature from the soil, leaving behind the whole of what is proper for other kinds of vegetables; but this doctrine has been sufficiently exploded by the philosophical Tull, and others. The nutriment of vegetables, which is derived from the earth, can consist of nothing but water, and such matters as are easily dissolved in that element; consequently the same fluid that nourishes wheat, contributes to support the poppy and May-weed that grow beside it, and the great difference in their qualities is caused by the digestive powers of the vegetables. Yet it does not appear capable of demonstration, that the food of vegetables does not consist of something more than what water will dissolve. The alternations of heat and cold, must cause a correspondent dilatation and contraction of the parts of vegetables. Cold diminishes the bulk of the sap, and causes the nightly dews to enter the leaves and stems, while the juices of the earth are also rapidly absorbed by the roots. But when the heat of the day dilates the sap, it is expelled from every part of the plant, and consequently its roots are then surrounded by a fluid which differs from water, and possesses powers with which both farmers and chemists are little acquainted.

The growth of wheat after clover is a fashionable practice, but it is not known that wheat will succeed better in this way than after beans or pease. If there is any reason to believe the former practice is preferable, it ought to be investigated; but if drilling should ever
be

be the order of the day, there are many reasons to prefer manuring the clover leys in autumn, and drilling or dibbling beans or pease upon them, in the spring to be followed by wheat.

It is probable, however, that the row culture may be one day found an effectual substitute for fallows, in which case many courses of cropping might be adopted, that would prove ruinous to the broad-cast cultivator.

SECT. VI.—WHEAT.

WHEAT is usually sown on about two-thirds of the open-field fallows, with the exception of the light soils.

Manure.—It is the common practice in every part of the county, to fold as much as possible of the land which is intended for wheat, and its success is an unquestionable proof of the propriety of the practice, in all cases where it is deemed proper to sow wheat after a summer-fallow. The dark green colour of the wheat in spring, marks with much accuracy, the extent over which the fold has passed; while the parts which have been manured with yard-dung, present in general, a pale and sickly appearance.

The latter kind of manure is supposed to retain an undue quantity of wet in the soil, which in clays is very injurious to winter corn, an effect which is sometimes so remarkable, as to induce the belief that the produce of wheat is lessened, rather than increased by its use. Wheat is not often sown after fallows on the
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light soils, and in consequence seldom receives any manure, though a top-dressing of yard-dung, or the fold, is never applied without manifest advantage.

Tillage.—The seed-ploughing, when the seed is intended to be ploughed in, should be given as thin as may be convenient, as wheat is more liable to be *buried* than most kinds of corn. It is not common to harrow the ground, either for the purpose of covering the seed, or to break the clods and level the surface; though instances of this practice with the latter intention, have been observed at Silsoe, Gravenhurst, and a few other places.

The soil is often so wet at wheat sowing, that it could not be harrowed with any prospect of advantage; it is also believed, that a very fine mould on the surface is prejudicial to the crop, on account of its promoting the growth of May-weed, poppies, and other weeds that are capable of surviving the winter frosts. In a dry season, clodding beetles, &c. are made use of for reducing the clods to about two or three inches diameter, which is a size that is deemed to afford a protection to the wheat from the cutting blasts of winter.

It is a prevalent, but not universal practice, to *ridge* the land at wheat seed time, and on cold wet soils the propriety of it seems to admit of no dispute, as without a proper elevation in the middle of the ridges, or lands, as they are here termed, the wet is so long ere it finds an exit into the furrow, or the subsoil, that its coldness is destructive to the powers of vegetation.

The preparation of bean-stubbles for wheat consists, for the most part, in a single ploughing, and three or four

four harrowings, according to the state of the land. There is seldom any leisure for more tillage, and the friability of bean-stubbles does not, in general, appear to demand it.

The clover-leys are generally sown with wheat, on all descriptions of soil. The land, if fed (which is not very common), is ploughed as soon as leisure offers after harvest, and the seed is sown at the usual time, and covered by three or four harrowings, either with or without rolling. Opinions appear to vary on the propriety of sowing clover-ley wheat on a fresh or stale fallow, from which it may be presumed the advantage of either mode is not very striking.

The tillage which is usually given for wheat, and the good success which attends its growth on mild and friable soils of all descriptions, is a proof that hard clods, as well as the matted roots of grasses, &c. oppose obstacles to the progress of its tender fibres, which retard its growth and diminish its produce. The proper degree of tillage is, therefore, such as produces a moderate degree of pulverization in the soil, whatever may be its nature. In light sandy soils, a pulverized surface is easily obtained; but as such soils carry little beside ray-grass at the end of the second year's seeds, when it is broken up, the roots of that grass should be well divided by harrowing, and the hollows between the furrows should be closed by the use of the roll, as, without this precaution, the putrefaction of the grass-roots will be impeded, and the wheat-roots will penetrate into the intervals between the furrows, from whence no nutriment can be derived. Wheat after ray-grass is seldom very productive, an effect which is by some ascribed to the exhausting effect of the ray-grass, but which is apparently more justly ascribed to the
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the soil. Light sands have never had the appellation of good wheat land ; even the ray-grass is sown in general for no better reason, than that a full crop of red clover cannot be obtained.

If ray-grass has the effect of exhausting the soil, such as sow only the red clover along with it would, if they regarded this circumstance, never suffer it to lie unploughed when the clover was exhausted and gone ; as, if the ray-grass diminishes its fertility, the longer it is permitted to grow the more will the soil be impoverished, which is an effect contrary to all experience. The practice of feeding ray-grass layers with sheep, and folding them on a distant part of the farm, is in itself a sufficient reason for the deficiency of the wheat crops in such situations.

The farmers on the cold wet clays of the north, and other parts of the county, complain that their clover-ley wheat is frequently light and unprofitable ; but it does not appear that any variation from the common method of sowing on one ploughing, has ever been attempted to remedy this deficiency. If the usual harrowings at seed-time prove insufficient to pulverize the soil, the land may be ploughed at the latter end of July, or in August, and harrowed repeatedly before sowing.

The practice of tempering clover-ley, or repeatedly ploughing and harrowing it in the latter end of summer, was long fashionable in Norfolk, on soils which seemed to need little pulverization ; but there are objections raised against it, which are likely to prevent its introduction in this county. Among these may be mentioned, the additional expense and trouble attending it at a busy and important season of the year, and the consequent loss of a second crop of hay or seed.

BEDS.]

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The farmers who complain of the failure of wheat after clover, admit that it succeeds well after beans, from the more pulverable state in which they leave the soil ; but in this case, Nature does the whole business, as a hoe is scarcely seen out of a garden in all the north of the county.

If both wheat and beans succeed clover, there is much reason to believe, that dibbling the latter on the clover-ley would be liable to no objection ; and if kept in a clean state by the use of the hoe, there is no ground to predict a failure of the succeeding crop of wheat, notwithstanding its distance from the preceding fallow. The manure might also be laid on the bean land instead of the fallow.

Sort.—The red Lammas is in very general use in every part of the county, but a considerable quantity of white wheat is sown in some places. It is considered as less hardy than the red, and is oftener adopted on the light soils than those of a strong heavy kind, and its superiority, if any, appears to consist in its producing the whitest flour.

Cone wheat, or rivets, is very little used ; but is occasionally sown under hedges, or in small enclosures, on account of its being little subject to the depredations of birds. Velvet-eared wheat, which is called in this county white-chaffed red wheat, and thick-set wheat, bears a close square ear, which is covered with down. It is said to be less liable to lodge in wet weather than most others ; but several farmers who tried it a few years since, have returned to the old red Lammas, which, in addition to its other recommendations, is said to thrash out of the ear more freely than most of the other common kinds. The bearded spring wheat
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has been sown within the last few years in various parts of the county : it was much recommended, on the ground that its produce was usually more abundant than that of the common sorts, which, though partly granted by those who have cultivated it, is said to be counterbalanced by the inferiority of its quality.

Seed.—The utility of a frequent change of seed has obtained almost a general belief; yet a neglect of this precaution for some years, frequently produces no perceptible bad consequence. It is well known to naturalists, that vegetables accommodate themselves by degrees to the nature of the climate and the soil; the corn that grows on warm soils, acquires a habit of ripening more early than such as grows on cold wet clays; but the farmers of this county appear to pay no regard to this circumstance. A change of soil, whether from sand to clay, or clay to sand, is supposed to be equally effectual; and many approve of seed from the chalky district, which is remarkable for ripening late, though sometimes sown early in August.

Some farmers procure wheat from Burwell, in Cambridgeshire, which is said to possess the good quality of ripening more early than common wheat, during two or three successive seasons.

If it be a fact, that corn degenerates in its quality when sown for many years on the same sort of land, it furnishes an argument for change of seed, independent of the utility of early ripening.

The organs of nutrition in vegetables are capable of converting to their own nature the juices of various kinds of soil and manure; yet the experiments of chemists have proved, that corn growing in dry, sandy, or stony soils, contains more of the siliceous or flinty

principle than such as vegetates on clays. Hence it may be concluded, that different soils cause a slight variation in the constituent principles of corn; and that a mixture of clay, sand, chalk, and the various kinds of manure, is, in all probability, the only kind of soil on which corn may not be expected to degenerate.

Steeping.—The utility of various steeps which are applied for the purpose of preventing the smut in wheat, may be said to be well established; but the best way of performing this business must be learned by experiments instituted for that purpose.

A very common practice, is called *battering* the wheat, and consists in laying it on a floor, and wetting it with water in which some salt and lime is mixed; after which, some dry lime is sifted on the heap, and the whole is well mixed together.

Others put the wheat into a tub of salt and water, and skim off the light corn, smut-balls, and seeds of weeds, previous to liming of it; but the success which attends either mode is very partial. Mr. Paine, of Felmersham, is satisfied that a brine which is made strong enough to bear any egg (as they are not all equally liable to sink), will effectually prevent the crop from being smutty; yet some farmers use little or no salt, and depend principally on the caustic nature of the lime.

Mr. Maxie, of Bromham, observes, that the prevalence of smut seems to depend much on the season. He washes his wheat in fair water, and only *dries* it with lime.

To thrash wheat on the floor where smutty wheat was thrashed, or even to put it in the same sack, are
mentioned

mentioned as causes of smutty crops. Some farmers have thrashed smutty wheat on a sanded floor, to take away some of the dust; and others employ people to pick the sheaves previous to thrashing them.

Mr. Thompson, of Sundon, puts urine on his wheat in the morning, and sows it the same day. He finds it an effectual cure for the smut. The superior efficacy of urine is well known to many farmers, yet they make but little use of it, as wheat thus treated has been known to lose its powers of vegetation by lying in a heap two or three days previous to being sown. On the whole, there seems reason to believe, that nothing is so efficacious as urine; but the difference between this fluid in a recent state, and when it has been kept some days, is very great, and ought to be investigated, as also various other particulars relative to its use. It is observed, that urine will destroy the smut without injuring the wheat, if sown within a few hours; but it is also equally certain, that a proper mixture of water would prevent any injury to the growth of the wheat, without destroying the efficacy of the steep, which will be sufficiently manifest from a consideration of the following table of experiments, which I have extracted from Mr. Young's *Annals*, vol. xli. p. 12.

A Table of Results in a Set of Experiments, made principally with a view to ascertain the Value of different Steeps in curing the Smut in Wheat, and promoting its Growth, with Twelve Samples of Good Wheat (A), and Twelve Samples of very smutty Wheat (B), each Sort steeped in twelve different Solutions of Substances most easily to be procured; sowed in Rows in Leighton Field, on a sandy Soil belonging to Mr. Grant, 27th of February, 1802, by Mr. B. Bevan.

Solutions in which the Grains were steeped twenty-four hours.	Specific Gravity of the Solution.	Bushels per Acre.	Number of smutty Ears in three Sheaves.		Bushels of Good Wheat per Acre of Produce.		Cwt. of Straw per Acre.		Total relative Produce, allowing 8 cwt. of Straw equal in value to three bushels of Wheat.	
			A, good.	B, smutty.	Good.	Smutty.	Good.	Smutty.	Good.	Smutty.
1. Of Potash,	1.357	3	1	81	21	6	36	6	92	62
2. Of muriate of potash,	1.097	3	3	218	20	10	1	0	87	46
3. Of nitrate of potash (saltpetre),	1.080	3	7	115	23	8	36	9	100	67
4. Of soda,	1.056	3	9	159	20	11	7	35	6	87
5. Of muriate of soda (common salt),	1.089	3	0	290	24	0	5	41	96	60
6. Of sulphate of soda (Glauber's salt),	1.047	3	12	241	21	6	12	3	92	64
7. Of muriate of ammonia (sal ammoniac),	1.026	3	1	150	19	8	17	6	85	60
8. Of common soot,	1.025	3	0	123	20	8	11	4	88	71
9. Of lime saturated (lime water),	1.003	3	0	2	21	5	12	4	94	53
10. Of nitric acid (aqua-fortis),	1.016	3	—	—	—	—	—	—	—	—
11. Of muriatic acid (spirit of salt),	1.011	3	0	136	20	7	16	1	88	63
12. Of sulphuric acid (oil of vitriol),	1.050	3	0	0	20	4	17	8	87	76
13. Dry in its natural state,	—	3	6	323	20	3	14	7	91	0
14. Washed in common water,	—	3	none sowed	107	—	18	3	38	5	73

N. B. Neither of the samples steeped in No. 10, came up.

The experiments of Mr. Bevan appear to me, of no small importance; they are particularly worthy of the attention of those who wish to see agriculture assume a scientific character. The author of those experiments, if not engaged in other business, could have furnished many interesting observations on points that seem to require explanation; at present, I can only make such remarks as may be deduced from the table. The nitric acid destroyed entirely the power of vegetation; yet it would be a very unfounded conclusion, that it cannot be used on that account.

The proportions of the mixture appear to be about twenty parts of water to one of aqua-fortis; but had the strength of the solution been lowered after the rate of fifty to one, the smut would probably have been destroyed, or the same consequence might have happened, had the wheat been steeped three hours, or even one, instead of twenty-four.

The effects of the oil of vitriol are very remarkable, as the smut was entirely prevented without injuring the crop; and the lime-water was almost as efficacious, though containing only that small quantity of lime which water will hold in solution, or about one part of lime to 500 of water. In this case it appears probable, that wheat steeped in lime-water 24 hours, will be better secured from smut, than if mixed with 100 times as much lime in the state of *batter*, as the lime will perhaps never reach the body of the corn at the downy end, where the smut often lodges.

The good effects arising from common salt are very inconsiderable, and seem to shew, that its merits have been much over-rated.

It appears that washing the wheat in common water is not an effectual preventative of the smut. Mr.

Bevan doubtless neglected to *dry* it with lime ; but it does not seem clear whether it was steeped in water for 24 hours, or simply washed.

Some farmers have sown a part of their field with wheat in its natural dry state, and have had very little smut, and others have suffered by attempting the same practice.

That the infectious nature of smut should have been called in question by modern and respectable writers, is not easily accounted for, as it is evident, that not one farmer in 100 can be found to support that side of the question.

In a field which is much affected with smut, if a smutty ear be drawn up gently, it is at least five to one that any other ear that may spring from the same root is affected by the same malady.

Of this circumstance I have seen the most abundant proofs ; and there surely needs no other to prove, that the disease originates at the root, though it has not been proved that the extent of the disease may not be much affected by the soil, manure, and state of the seasons. In July 1804, a smutty ear was pulled up from the root, from which it was found that another stalk proceeded, the ear of which had not then made its appearance ; but the ear was found by opening the stalk with a knife, and the corns in that immature state were black through their whole substance.

Another instance of the same kind has been met with since that period.

August 4, 1804.—Twelve corns of wheat that were found in a smutty ear, were set in a garden-pot, and afterwards the pot was taken away, and the wheat, with the mould which surrounded it, was set in the garden. It grew more than one foot high in the first season,

season, but did not come to ear much earlier than other corn in the following season. It was expected to produce nothing but smut, and to secure this point more effectually, four of the corns were inserted into smut-balls, in such a way that the first roots should pass immediately through the black powder—but not a single corn of smut was to be found in any of the ears! In the same year a quantity of smut-balls were broken, and mixed with water in a cup, and 16 corns of wheat were soaked in this black water, till it was thought to have impregnated their whole substance. The wheat was afterwards planted in a fertile garden soil, and produced a great number of ears which contained no smut, nor any other appearance of disease.

It was suggested, that as the wheat and smut were immersed in water for a considerable time (probably 48 hours), the nature of the infectious powder might undergo a change by putrefaction, &c.

In consequence of the failure of the foregoing experiments, another trial was made in the spring of 1806, by mixing the dust of smut-balls with some spring wheat as intimately as possible.

Three rows of the smutted wheat were planted in a fertile part of the garden, and a small handful was also sown in a bunch, where the soil was poor and foul. The corn which was set in rows grew very luxuriantly, many of the corns producing 20 ears. There were 28 roots at harvest, 5 of which appeared entirely free from smut, and 23 had received the infection. Several of the roots did not bear a single healthful ear; some of them produced only one or two that were diseased; and in other cases, only a few ears, or a few corns, had escaped.

In the bunch of smutted corn, 100 ears were smutty,
and

and 54 good. Thus it appears, that though wheat is susceptible of the contagion of smut, yet this effect does not invariably take place, though exposed as much as possible to its influence ; and such is known to be the case in the diseases of animals. The result of the experiment on smutty water, though made on too small a scale, renders it probable, that steeping the wheat in water may be sufficient to destroy the power of infection, without any other addition ; but the effect will depend on the time during which the immersion continues, as 12 hours, or 24, or even 36, may be insufficient : but in such cases, a few well-conducted experiments would prove, almost to demonstration, in five years, more than may otherwise be proved by cool plodding experience in as many centuries.

The most effectual preventative of smut seems to be the use of such seed as is nearly free from it ; and the cheapest ingredient for a steep, is urine diluted with water.

Steeping the corn is not expected to increase its powers of vegetation, nor to prevent the blast, or the mildew ; yet the experiment of Mr. Bevan seems to shew, that steeps are useful even in this point of view, though a single experiment on such a small scale is insufficient to prove any thing of that kind. Such as believe that the urine is the most valuable part of the manure made by sheep, will readily allow, that human urine combined with lime, &c. in such a manner as not to destroy vegetation, is as likely as any substance in nature to promote it.

Quality of Seed.—Many farmers prefer wheat that grew on land newly broken up from a state of pasture, but the reason of this preference does not appear. The
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corns of such wheat are commonly thin and *guttery* : and though thin wheat is not considered as more fit for the purpose of seed than such as is of a better quality, there is reason to believe, that very few farmers apprehend any danger from using seed-wheat of an inferior quality.

Four rows of wheat were planted in a garden at Liddington, in the autumn of 1806, for the purpose of discovering the effect of the quality of the seed on the growth of the crop, &c. The plumpest corns appeared evidently stronger in their growth than the other during the whole of the winter, nor did the difference cease to be discernible till the appearance of the ear. The small corns that were used were as thin and shrivelled as could be discovered, yet there was not more than one in twenty that did not vegetate. They were sown in alternate rows, that no doubt might be entertained of the fairness of the experiment. The growth of the thin corns shewed an evident inferiority both in the length of the stalk and broadness of the *flag* ; but the birds and the mildew rendered it impossible to examine the relative quantity of the produce.

Garden experiments have been justly thought liable to objections in some cases, yet in the present instance, it seems rather the reverse ; for if a soil which is too fertile for wheat, is incapable of overcoming the original defect in the seed-corn, it is probable that on poorer soils the defect would appear more remarkable. It is, indeed, the opinion of some of the more intelligent farmers, that many corns would not grow, that are capable of vegetating on more fertile situations ; or, if they did support themselves for a time, their feeble roots would not be able to penetrate the soil, or to defend themselves against the severity of winter.

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The substance of the seed affords a more nutritious aliment for the young plant than can be obtained from the soil, and must be supposed rather to afford health and vigour, than to increase very considerably the size of the vegetable.

Quantity of Seed.—In this respect there is scarcely any variations in the practice of the farmers.

Two bushels and a half is the common quantity on clay soils; but where the soil is rich, two bushels are esteemed sufficient. On the sands, three bushels are generally allowed. Poor soils, or a late seed time, are esteemed sufficient reasons for allowing a greater quantity of seed than is usual under opposite circumstances.

Time of Sowing.—The farmers of the chalky district are remarkable for early sowing; as, if it is not sown early, it is liable to be thrown out of the ground by the winter frosts. The chalky part of the county is esteemed cold in soil and climate, and the wheat is late in ripening, though sometimes sown at the beginning of August. The general time of wheat-sowing may be said to be the whole of October; there is, however, in most seasons, a period of two months occupied in this business, dependent more on circumstances than opinion.

On rich and warm soils, early sown wheat is inclined to grow rank and luxuriant in a mild winter, in consequence of which, it is said to turn pale and sickly in May, and yield a light produce at harvest; but on clays in general, no danger of this kind is apprehended.

The north of Bedfordshire is remarkable for cold wet clays,

clays, and late harvests; yet it is not common to sow much wheat before St. Michael.

Mr. Tyler, of Keysoe, observes, that early-sown wheat is best in a frosty winter; but in a wet winter, the late sowed is most successful.

Mr. Wilson, of Ravensden, mentions the 1st of November as a common time for wheat-sowing in that neighbourhood. Mr. Platt, of Liddington, thinks that early sowing is useful on sandy clover-ley. The wheat is not liable to become winter-proud on light sands; and if sown late it is very liable to be destroyed by larks, which it is scarcely possible to drive from the field.

Depth.—Wheat that is ploughed into the soil is liable to *bury*, in consequence of which a shallow furrow is preferred. If the seed is ill-covered, it is often injured by the birds; but in other respects, it does not appear that the depth is of any consequence to the future crop.

Mr. Pickford, of Market-street, employs a herd of 200 swine, by driving them for three hours in a day over newly sown wheat, to consolidate the soil. The same gentleman is very careful to pick up the couch and other grasses on the clover-ley wheat. I observed thirty-three men and boys occupied in this business in the autumn of 1806, at an expense, as is supposed, of 7s. per acre.

Drilling and Dibbling.—Wheat is drilled with nine-inch intervals by the few who pursue the row culture; but the business has been generally managed with so little attention to the quantity of seed, produce, and other circumstances, that nothing material can be added

added in this place to the general observations on the row culture.

Broad-cast wheat is scarcely in any instance attempted to be cleaned by the use of the hoe. Hocking, without drilling or dibbling, seems indeed to vie in absurdity with the practice of drilling without hocking.

Feeding of Wheat.—Is sometimes practised, to check its luxuriance; but it is thought this business should be discontinued early in April, though some affirm they have fed, and even folded upon wheat, as late as the beginning of May, with much advantage.

Harvesting.—The sickle is invariably employed in this business. The wheat is cut about twelve inches from the ground, and is either laid on the ground to dry, or put immediately into bands, and bound as it is cut down. The former mode is supposed to be most favourable to the gleaners, though it affords an opportunity of drying the straw more completely than is the case when it is bound immediately; for if the straw be moist, or mixed with green weeds, the middle of the sheaves are long in drying.

Ten or twelve sheaves are usually placed together, though in the fields near Bedford they often place four sheaves on the opposite sides of a central one.

The precaution which is adopted in some parts of England, of covering the *shocks* which other sheaves spread into a kind of thatch, is not attended to in this county, neither does it seem to be necessary in general, though it may be advisable in a wet season.

Mildew.—Mr. Maxey, of Knotting, made some observations on this subject, in reply to Mr. Young's circular

circular letter, in 1804, the principal of which are here inserted.

“ 1st, Woodlands, and new lands broke up from ancient pasture, have suffered most; such soils producing the most luxuriant growth, and being later before they come to maturity.

“ 2d, In general, late sown have suffered most; but in the late season not exactly so; as, in some instances, I discovered the early sown, and such as was earliest in the ear, to have received the greatest injury. This is different from all former years that I have noticed, and shows that much depends on the time the infection is in the atmosphere; nevertheless, I think it advisable to sow early, particularly on all cold soils.

“ 3d, Low and sheltered situations, I conceive most susceptible of receiving this malady.

“ 4th, Thick or thin sowing seems to have no effect as to the mildew. A bushel sown on an acre, on some soils, will produce more straw than three on another; and it is the wheat on those soils that produce the most luxuriant growth, that is, the most susceptible of mildew; and I think it most advisable to sow thick, even on those soils.

“ 5th, I have made use of both old and new seed for several years, but have not discovered any difference as to the effects of mildew.

“ 6th, Mildew often affects certain parts of a field, or even small spots on a single *land*, which seems to depend on variations of soil, or condition of the land.

“ 7th, It is in general admitted, that the wheat sown on fallows has been injured the least; yet on a thin cold clay, which soil has been long admitted to be least subject to mildew, a whole field in this neighbourhood has suffered in a much greater degree than any
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that have come within my knowledge; insomuch, that the production per acre will not be equal to three bushels of good wheat.

“As to the time of cutting mildewed wheat, it should be governed by the following circumstances, viz. if beyond a milky state when first affected, it is advisable to cut it immediately; but if in a milky state, it is very immaterial when cut, as to quantity or quality; but I am of opinion, the longer it stands, the better it will come from the straw.”

I believe Mr. Maxey's opinions differ but little from those generally entertained respecting the mildew; yet the effects of thick or thin sowing are sometimes stated in a different manner. It is common to sow thin on soils that produce much straw; for if a great quantity of seed was allowed, the stems would be individually so weak, that the corn would be laid flat to the ground before harvest; and it is a well known fact, that corn which is laid, loses its vigour, retains the air and moisture in a stagnant state, and seldom entirely escapes the mildew in the most favourable situations. On the other hand, several farmers assert, that the mildew is most prevalent in such crops as are sown thin, or are destroyed by the wire-worm, or the winter frosts.

In such cases, if the soil be in good condition, the plants tiller (or *gather*, according to the provincial term) in the spring, and sometimes very late in that season. Such crops generally appear of a deep olive green in May, and the period of ripening seems to be delayed two or three days. The mildew does not invariably affect the wheat under such circumstances, though it does not often escape. It is an old observation in this county, that wheat which *mays*, viz. turns yellow in that month, never mildews. And as such is
supposed

supposed to be a consequence of sowing early on rich soils, it may furnish a means of avoiding that malady. Some have supposed, indeed, that the produce is lessened by this means as well as by the mildew; but if the wheat is drilled, the hoe will invigorate it as much as may be deemed desirable.

The effects of the mildew in the neighbourhood of Lidlington have been so various, as to bid defiance to any general theory, and to warrant the conclusion, that many concurrent causes have a share in producing that formidable malady.

In 1804 some wheat on the sandy hills of Liddington almost entirely escaped the infection, though ripe only three or four days before much that was severely injured. Many fields in Marston, Wootton, Houghton, &c. were little affected, while the wheat on many light woodland clays was reduced to less than half of the average quantity. It is further remarked, that a field in Ridgmount, which generally produces a luxuriant growth of straw, was as free from mildew in 1804, and the corn as little deficient in plumpness, as has generally been the case in more genial seasons.

Barberries.—I found Mr. Maxcy, of Knotting, decidedly of opinion, that the barberry-bush is capable of causing the mildew to affect the contiguous wheat. “I ground this opinion,” he observes, “on the following circumstance, which attracted my observation some few years back. I was passing through the open field of a neighbouring parish, on the eve of harvest, when I noticed some streaks of a different and darker hue, across a furlong of wheat, from a hedge that ran down on the north-west side of it: I immediately went to the extremity of those streaks, and traced across the

furlong to the hedge, with a view to discover the cause, and directly opposite to each of those so marked columns, was a barberry-bush.

“The effects of the mildew extended about twenty poles. I must observe, there was some partial mildew that year in this neighbourhood, but that this field was in general very little affected.”

Several towns which are contiguous to the winding course of the Ouse, to the north of Bedford, are remarkably subject to the mildew; as Pavenham, Felner-sham, Sharnbrook, Bletsoe, Milton Ernest, and Oakley. Barberries are to be met with in all the parishes above-mentioned; but their existence may even be taken as a sufficient proof that opinions are not unanimous on the subject of their causing the mildew; for were that the case, it would be as difficult to account for the patient sufferance of a nuisance of such great magnitude, as it is to explain their manner of operation.

At Milton Ernest, the first information which I received was in favour of the barberry-bush; for it was observed, that the mildew could not be ascribed to a shrub which has possessed their hedges for time immemorial, as the malady was uncommon a few years ago. Others, partly granting the fact, that barberries and mildew are found in the same neighbourhood, account for it by the supposition that the soils which are most adapted to the growth of barberries, are also the most liable to mildew; but unfortunately for this theory, it appears that this shrub will grow in any situation. There are yet others who pay perhaps too much homage to antiquity, and believing the knowledge of their grandsires to be superior to their own, are satisfied the barberry has no power to injure the wheat, because it was not discovered 100 years since.

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At Melchbourn, I found the idea of barberries causing the mildew, treated with ridicule; yet in a field of Lord St. John's, where there were barberries, I observed the wheat was much injured by this malady, and was informed that such was equally the case when the field was wheat before. The wheat was of very little value within four or five poles of the thick hedge, though only one or two barberry-bushes were discovered. The cocksfoot-grass by the side of the hedge was mildewed as much as the wheat, which does not seem to be a common circumstance.

Lord St. John's bailiff and gardener ascribe the mildew to thick high hedges, &c. which prevent a free circulation of the air; but this seems insufficient to account for the remarkable instance of this particular field being severely injured in 1803 and 1806, when there was little in the rest of the county. Mr. Paine, of Felmersham, has seen convincing proofs of the injurious effects of the barberry, and this even in a *ripening* year, but in good seasons the effect is not extensive. "Mr. J. Lavender, who was buried at Felmersham, is reported to have been well acquainted with the destructive quality of the barberry-bush many years ago. He persuaded the farmers of a parish in Northamptonshire to destroy them, to their great advantage."—*Rev. T. O. Marsh.*

Mr. Bithrey, of Bletsoe, believes the wheat does not mildew when the barberry is very small. This gentleman accompanied me to a field where the mildew proceeded from a large bush of this kind in stripes, which he supposes are according to the direction of the wind, which spreads the infection. He believes the infection may pass two hundred yards, as a field at that distance across the Ouse was mil-

dewed. The bush was covered with white mildew till the rains washed it off. Mr. Poole, of Milton Ernest, is uncertain as to the effects of the barberry. He observes that they cut the wheat and beans early when affected by mildew, but they sometimes get better by standing. Some land is laid to pasture at Milton in consequence of the mildew. Oats and clover seed are often much injured by this malady. Beans are frequently covered with it, appearing like snuff, but the corn is not always injured. Barley is never mildewed (says Mr. Wills, of Felmersham), and is therefore not unseldom a more profitable crop than wheat. The fogs of the low situations near the Ouse, are suspected to contribute not a little in the production of mildew, but many people seem to take it almost for granted, that the whole effect is ascribable to some single cause, though perhaps half a score of agents are concerned in the business.

At Luton, I am informed that most of the barberries have been destroyed in consequence of a general belief of their power of conveying infection.

Mr. Wilson, of Biggleswade, spoke of the effect of this shrub as well known, but observed that it seldom injured the wheat to any considerable distance.

Mr. Runciman, of Woburn, has suffered much from the mildew, a great part of which he attributes to a barberry hedge of several poles in length, in the centre of the farm. I observed the mildew in the neighbourhood of this hedge in 1805. It extended three or four poles from the hedge, which was thin and low, and the wheat appeared as if it had been scorched. The infection injured the whole field, but the part immediately contiguous to the hedge was not worth thrashing..

In 1806 I examined a field of rye in Ridgmount, where

where it was said the corn had been frequently mildewed, and ascribed to a single barberry in the hedge. The rye was carried, but the scattered ears in the neighbourhood of the bush contained scarcely a single corn. The effect in this case cannot be ascribed to a want of air, as the field was open on the south west side, and the barberry situated in an eastern hedge.

5 The experiment on thin and plump wheat used for seed, was made very near to a barberry, and the wheat was remarkably mildewed in the present favourable season (1807). Some may ascribe this effect to the luxuriant growth of a garden, but on this occasion particular attention was paid to some wheat which grew where a dunghill had been placed, and which was laid by the luxuriance of its growth. The mildew was much the most remarkable in the garden experiment, though the wheat was held up by a string, and exposed to a free current of air. There was a mixture of the red and black mildew in both cases, but the shrub never exhibited the least sign of disease, nor produced any blossoms. That the barberry should mildew the corn without having exhibited any pre-previous signs of disease in itself, is a circumstance which is apparently as unreasonable as any supposition in nature, but the fact ought to be the primary business to be inquired into in all cases. The weight of evidence here produced, may not be sufficient to convince the cautious inquirer into Nature's secrets, but when the practical farmer possesses an option either to sow other corn near the barberries, instead of wheat, as is said to have been done in Norfolk, under the apprehension that they *may* be injurious, or to destroy them, and thus calm all apprehensions at once, he will instantly know what course to adopt. There are many

people in Bedfordshire who would not be easily persuaded to kill a raven, or a red-breast, yet I know not that any such ominous fatalities have thus long preserved the life of the barberry, which I have some reason to believe, may be found near the corn-fields of twenty parishes in this county. "Botanists have long known (and every farmer ought to know), that the blight or mildew of corn, is occasioned by the growth of a minute parasitic fungus or mushroom on the leaves, stems, and glumes (or chaff), of the living plant."—*Sir J. Banks.*

As probably one hundred of these plants appear like an individual mass to the naked eye, it is not extraordinary that their habits and functions are little known. The philosophy of the lower ranks of mankind, generally leads them to believe in equivocal generation, or in other words, they have no idea that the various species of *mould*, *mosses*, *lichens*, *mildew*, or even common mushrooms, are propagated by seed, though the fact is well known to the inquirers into Nature's secrets, as also that their numerous and invisible seeds are so light as to be easily carried by the atmosphere into every place where it can gain access. Hence it happens, that whenever any vegetable or animal matter is exposed for a few days to moisture and a stagnant air, the species of mould, &c. which is peculiar to it, makes its appearance, and spreads with great rapidity. It may be deemed rather incorrect, to say that the mildew of corn is a species of *mould*, though it is in the same class, and propagated and nourished in the same way.

The mildew is supposed by many to be produced by *blue* mists, and a continuance of foggy moist weather. Others suppose an alternation of frosty nights and

and hot gleams injure the wheat, and thus render it more liable to receive or less able to expel the malady.

The seeds of mildew are constantly in the air, but in dry weather, the pores of the straw are closed, and afford no nourishment to the seeds which may be slightly attached to them, or the vigour of the perspiration carries away in the day time, such as have not had sufficient time to take root. When a few of these plants have had time to perfect their innumerable seeds, a continuance of dull weather causes them to attach themselves wherever the wind may carry them.

Farmers are not agreed as to the propriety of cutting mildewed corn early or late, neither does it appear a subject of such vast importance as some have imagined.

It has been advised to cut the corn as soon as it is perceived to be *attacked* by the mildew, and thus prevent its being *robbed* of its flour by the *fungus*; but it is obvious that the attack of the mildew is no sudden business, neither is it clear that any part of the substance of a corn of wheat ever returns to support the life of this parasitical vegetable, that preys rather on the juices which proceed from the root, and intercepts them in their passage upwards. In the most genial season the corn shrinks at the period of ripening, which is an obvious consequence of the evaporation exceeding the nourishment which is received. Mildewed corn shrinks before it is ripe from a similar cause, yet this is no proof that it has ceased to receive any thing from the stem, and still less, that nourishment once received, returns into the straw to support the mildew fungus.

Mr. Poole, of Milton Ernest, and several other farmers, observe, that wheat sometimes improves by standing, which is an effect that evidently depends on the degree of infection, and the subsequent weather.

I observed a field of wheat at Milton Ernest, in 1806, which was cut a fortnight sooner on account of the mildew, yet it was not *saved* by this means, as the corn was extremely thin and shrivelled.

Let sound healthy corn be cut a fortnight before it is ripe, and it will be found that the sycle has nearly the same effect as the mildew, viz. it intercepts the supplies, and that more completely than can be effected by any disease that has not operated previous to that period. With respect to cutting corn green, the same diversity of opinion prevails; it is said that early cutting gives the wheat a smoother appearance, and that it contains more flour in proportion to the bran: but if corn fully ripe is surrounded by a thicker coat of bran, it is evident the heat of the sun must have turned that part to bran which was once flour. And even this does not amount to a proof that there is less flour in each individual corn.

Produce.—I have in many cases abstained from asking this question, as it is a subject which some farmers are inclined to believe the public have no right to interfere with, and the rather, as they are in some cases apprehensive that the landlords are inclined to pay too little attention to the great expenses which attend even the poorest soils. The particular notes which have been made on this subject are as follow :

Stagsden—Wheat per acre when tithed, less than 20 bushels.

Turvey—19 bushels.

Sharnbrook, &c.—From six to ten bushels, when mildewed.

Felmersham—Mr. Paine could sometimes get eight loads

loads per acre, but it is often reduced by the mildew to be worth but little. This gentleman observed, that the mildew had lessened the value of his crops more than 1000*l.* in a few years.

Wimington—Six bushels per acre in 1804, but now (1806), apparently five loads. *Riscly*, 15 to 20 bushels. *Knotting*, 18 bushels.

Tilbrook—From 20 to 25 bushels.

Ravensden—About 17 bushels on small acres.

Staughton—Mr. Smithies, five or six loads.

Willington—20 to 25 bushels.

Sundon—17 or 18 bushels, with much London manure.

Dunstable—25 to 30 bushels, with manure.

Tingrith—20 to 25 bushels.

Dunton—20 bushels. *Crawley*, 15 bushels. *Eversholt*, 15 bushels. *Heath* and *Reach*, 18 bushels.

Brogborough—15 bushels. *Milton Bryan* 22 bush.

Ridgmount, *Cranfield*, *Leighton*, *Egginton*, *Billington*, and *Potsgrave*, 20 bushels. *Holcut*, 25 bushels.

Mr. Long, of Stondon, observes that 25 bushels, or more, is expected with good management in the ancient system of fallow, wheat, and beans.

Mr. Young, of Hexton, thinks the wheat crops in the clay vale below the chalky hills vary from 20 to 40 bushels. The following note on the variation in produce and quality, made at Woburn Park farm, may be here inserted.

Wheat.

<i>Years.</i>	<i>Average of Sheaves to the Load of Five Bushels.</i>	<i>Average Weight of Flour per Load.</i>
1802	81	250
1803	96	250
1804	120	196

The average produce of corn is, perhaps, as easily deduced from the Tables of Expenses and Produce, as from any other source. Such as suppose the farmers ought to gain more than is stated in the tables, may easily discover the amount of the produce which will realize any sum that may be supposed.

The average produce of wheat on the gravels and sands, is probably below 20 bushels. On good clay loams, 25 bushels may be expected after clover, but on clays in general, probably not more than 22 bushels, varying however, according to the skill and good fortune of the farmer, from 17 to 27 bushels, and in extreme cases, including mildew, &c. from 6 bushels to 40 per acre. It is not improbable, however, that the produce of wheat in this county may exceed these estimates, as some farmers sacrifice their sward, sheep, and time, in folding for this crop, in consequence of which the profits of their grass land are diminished in at least an equal proportion.

 SECT. VII.—RYE,

THE quantity of this corn which is grown in Bedfordshire, is much decreased of late years. It is little
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in demand for making of bread, and the price is consequently too low to render it an object of profit to the occupier of any soil of moderate fertility.

It is a general opinion, that rye ought to be sown early, or "see two summers." It has been sown at Liddington as early as the 20th of July, and fed in autumn with sheep and cows, and is said to have produced remarkably good butter. If the rye crop be worth attention on soils that have been marled, a great part of the profit must be derived from sowing it early, and feeding it with sheep, &c. in the autumn, winter, and spring. It is sometimes sown as late as November, and even in the spring, and the general quantity of seed is about two bushels and a half per acre.

Rye sometimes takes place of wheat on ray-grass layers, and is sown at one ploughing immediately after harvest. A farmer who lived formerly at Ridgmount, used sometimes to sow turnips very thick, for the purpose of ploughing them into the ground, to serve as manure for a crop of rye. He is said to have obtained good crops by this method; but turnips, or other green crops, are undoubtedly to be preferred on light-land fallows, as they enrich the ground instead of exhausting it.

The Rev. Mr. Williamson, of Campton, sowed some rye early, in dry weather. A part of it vegetated, and some weeks after, when rain fell, the remainder made its appearance; but the first which came up withered, turned red, as if affected with mildew, and died away.

The soils which are unfit for wheat, will sometimes bear a tolerable crop of rye, as the latter is most tenacious of life in dry situations.

If the nutrition which the soil affords is below a certain standard, half the wheat will be found to die away;

away ; but rye will frequently come to an ear, though the stalk be little thicker than that of ray-grass, and the ear contain but a single corn.

On soils which contain much moisture, rye will frequently die away, or produce a very deficient crop.

It is remarked, that when rye is very ripe before it is cut, a small shower will make it sprout ; and hence may be derived a reason for permitting corn to be *dead ripe* which is intended for seed, as otherwise the power of vegetation is weak and imperfect, and consequently hindered or destroyed by small causes.

The produce of rye is extremely various ; it is sometimes below 20 bushels, and does not often exceed four quarters, though 50 bushels, or more, have been obtained in a few instances, by the united aid of fallow, fold, and yard-dung ; and even such a crop, under all circumstances, may be supposed no profitable substitute for a crop of turnips. An instance occurred last year (1806), in the parish of Millbrook, of rye sown among a crop of late turnips, and covered by the hoe. It was permitted to stand for a crop, after feeding off the turnips, and was perhaps nearly as good as might be expected from a poor soil.

SECT. VIII.—BARLEY.

THE usual tillage for barley consists of one ploughing on every kind of soil, with scarcely a solitary deviation, unless on account of the foulness of the land after turnips. The two or three ploughings which are considered as indispensable to good husbandry in Norfolk, are therefore rather a sign of a bad farmer in this county.

county. If land is free from couch, it is thought a desirable circumstance to leave it in rather a cloddy state, as the corn marigolds, and other weeds, appear to vegetate in proportion to the fineness of the tilth. On clay soils, and many of the sands, it is common to sow half the seed previous to ploughing the land; after which operation, the other half is covered with the harrows. Others harrow in the whole of the seed, and no disadvantage has ever appeared to follow this practice, as the depth of the seed seems of little consequence.

Manure.—In the unenclosed fields, the yard-dung is generally laid on the barley fallows, the sheep-fold being preferred for the wheat crop. The manure is laid on at any season of the year, when an opportunity offers, but commonly in the summer, when the land has been once ploughed or fallowed.

Sort.—The common barley is in general use; the four and six rowed barley (bere or bigg) has been tried, and discontinued, on account of its inferior quality, though the produce was supposed to be more than that of the common sort.

Time of Sowing.—The barley seed-time on the clays, begins as soon as the land is become sufficiently dry in the furrows, and which usually happens at the beginning of April. Much depends on the state of the weather, as, if wet falls immediately after sowing on binding *rosiny* land, or such as is inclined to run into a battery state, the shoots of the barley are unable to break the incrustation on the surface.

The time of sowing on light soils depends on the turnips
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nips being cleared off. It has varied from the middle of February to the end of May, but it usually occupies the whole of April. Early sowing is supposed advantageous to the crop, in allowing time for a gradual and regular growth; and there is little doubt that early-sown crops would prove the most valuable at harvest, in case the weather prove favourable in the first stages of their growth. The effects of rain and frost seem less injurious to barley on warm soils, than on such as are more retentive of wet. A sandy field was sown with barley at Liddington, in February 1799, and soon after it was sown, a fall of snow covered the ground for some weeks. It was predicted, that the barley would be chilled and perished; but it produced a good crop, which was ripe as soon as the wheat, and carted from the field previous to the ever-memorable hail-storm of the 19th of August, 1800.

It appears from other observations, that early sowing (as in March, or at the beginning of April) is advantageous on sandy soils, as the barley becomes established in the ground at a time when the weeds do not vegetate so freely as is the case in May; add to this, there is much to apprehend on the part of the barley in a dry spring, while the *golds*, and other weeds, quickly gain an ascendancy, to the ruin of the crop.

The quantity of seed is generally four bushels per acre, in most kinds of soil; and it seems rather a common supposition, that this is as much as is useful or necessary, though it is not known or supposed, that a larger allowance would injure the crop, as the farmers wish to see, according to a common phrase, "as much wheat as can stand, and as much barley as can lie." In a small experiment in the present season, part of a ridge of barley which was sown twice over, seemed rather

rather inferior to the rest, though that was not a heavy crop. The ears of the thick-sown barley were very short; but it cannot be foreseen, how far a season of greater moisture might have varied the result. The occupier of a part of the light sands on Millbrook-warren, 30 or 40 years ago, is said to have been remarkable for giving his barley-land a great number of repeated ploughings, harrowings, and rollings, for the purpose of obtaining the most complete pulverization; in consequence of which, he found two bushels and a half of barley amply sufficient for the purpose of seed.

This observation is derived from very respectable authority, and is here inserted to prove, that the effects of frequent stirring, and of fallowing in general, deserve an experimental investigation previous to the general adoption of those theoretical opinions, according to which it would appear, that *air, heat, and light* destroy, instead of increasing, the fertility of soils exposed to their action.

Harvesting.—Barley and oats are almost invariably cut with the scythe; and when much mixed with young clover, is generally turned once or twice, to prevent it from heating, or *mow-burning*. The corn should be thoroughly ripe before it is mown, as it vegetates more freely on that account.

Produce.—The general reply to queries of this kind is, about four quarters per acre. Some particular notes may be inserted, but they appear calculated to convey little information, as the varieties of soil and management are very considerable.

Cranfield, Leighton, Eggington, Billington, Tinchfield, and
Grith,

grith, Potsgrave, Crawley, Dunton, Willington, Tillbrook, Turvey, and several others, are stated at four quarters on the average.

Sundon, Risely, and Milton, three quarters and a half per acre. Heath and Reach, Eversholt, and Ridgmount, three quarters.

Dunstable, six or seven quarters. Little Staughton, five quarters. Holcut, five quarters. Knotting, four quarters and a half.

The average produce of barley is probably something more than four quarters per acre. If sown after a summer-fallow, five quarters per acre will not pay the expense of the first two years of the course.

Awns.—An instrument resembling a gridiron is sometimes used for breaking off the awns, or *hales*, as they are here termed.

Malt.—It has been before observed, that ripe corn is best for seed, and consequently for malt. It is generally believed, that barley is benefited by a shower of rain while lying in the field; and that a slight sweat in the mow takes away its *steeliness*, and causes it to make better malt: and the malt itself is observed to yield its virtues more freely, when exposed to the air for a time, to absorb some moisture. Good malt is supposed to contain fifteen per cent. of saccharine matter.

Straw.—This is frequently consumed and trodden to dung by dry beasts, at 1s. 6d. per head per week. The addition of clover makes the straw more valuable; but it increases the expense of harvest, and the danger of wet weather in that critical season.

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Some farmers appear to think that, in general, clover does not injure the crop with which it is sown; but I conceive it is an indisputable fact, that every vegetable derives a part of its support from the earth, and consequently, leaves a smaller portion of nourishment for any other crop. In a wet season, the clover has been known to rise almost as high as the barley on moist soils, and such has even been the case on some of the sands at Lidlington, when the clover has been sown with the barley.

Corn flourishes more in proportion to the fertility of the soil than its moisture. Clover demands moisture in preference to fertility; and hence may be seen the reason why they injure each other in different degrees, in various seasons. Natural fertility promotes the growth of every cultivated vegetable, though it is not equally necessary to all. The terms *exhausting* and *ameliorating* (or improving) are therefore not to be understood in a literal sense, and unconnected with the attendant circumstances. Who would venture to assert, that the most exhausting vegetable would not improve the soil, if mixed with the earth from which it derived its *principal* nourishment? And, on the other hand, is it not obvious, that the foremost of the improving crops will injure the soil, if carried away from the earth from which they derived a *part* of the matter which composes their substance?

SECT. IX.—OATS.

THE culture of oats is very little attended to in any part of this county, as beans are supposed more profitable, and less exhausting on clay soils.

The roots of the oat possess the power of penetrating a turfy soil, in a much greater degree than is the case with wheat or barley; they are therefore commonly sown on land lately broken up from a state of sward, as also on ray-grass layers which have been depastured two or more years.

It is mentioned in another place, that many consider ray-grass to be an exhausting plant, especially on strong soils; but this affords an instance of the incoherent manner in which agricultural principles are fabricated and maintained, on the authority of what is mis-called experience.

The farmers of this, and probably all other counties, have experienced that wheat will seldom succeed on such fields as, having been sown with clover and ray-grass, have remained in that state till the clover is gone, and the ray-grass has formed a turfy surface on a soil which is become too clung and tough by its own natural subsidence. Hence it is concluded, that this kind of grass has *exhausted* the soil; but apparently the same reasons might be adduced to prove that land is exhausted by lying 500 years in a state of natural pasture. Mr. Smith, of Kimbolton, and several others that have seen the practice of distant counties, contend that such land should be sown with oats, and will generally produce a sufficient crop to prove that *exhaustion*, at least, is out of the question.

Five quarters and a half of oats appears to be worth

as

as much, on the average, as fifteen bushels of wheat; but the former crop is probably of a less exhausting nature, as it furnishes the materials of a greater quantity of manure. On the light woodland clays it is often found necessary to sow oats after wheat or barley, as leguminous crops are very hazardous in such cases. They are also frequently sown after clover-ley wheat on the gravelly loams, and on some parts of the sandy district, being esteemed a more certain crop than pease.

Manure.—The whole of this is generally laid on the fallows, and consequently the oats seldom receive any aid of this kind.

Sorts.—Black oats are sometimes grown on the clays; but the white kinds seem in general to obtain a preference, as the former are liable to *stain* the samples of barley and wheat.

The potatoe-oats are esteemed the most proper for good land, or to sow after turnips instead of barley; but as they are a dwarfish sort, many deficient crops have been obtained on poor soils.

The Tartarian, or horsetail-oats, have been sown by various farmers. Their produce is large, but they are very light, and little esteemed, though probably the most proper for land of inferior quality.

Change of Seed.—Oats are supposed to be very liable to degenerate, and the produce of the fens of Cambridgeshire, &c. is frequently used for seed, though it does not appear easy to explain on what principles the change is founded, unless they are supposed to retain the habit of luxuriant growth, which is however accompanied with a deficiency of weight in the corn.

Time of Sowing.—Black oats seem to partake of the nature of winter corn, and are commonly sown in February, or the beginning of March. If sown late, they ripen unkindly, and lose their clear black colour. They are frequently harrowed in along with the beans, or a week or two after the beans, when the latter are ploughed in, with the intention of supplying the deficiencies of the bean crop, on such light shallow clays as are not well adapted to the growth of that vegetable.

A small field at Tuddington was sown with black oats in November. Clover and ray-grass were also sown at the same time. The crop was sufficiently good to admit of being reaped, and the stubble, in which the ray-grass had seeded, was afterwards mown for hay.

White oats in general are of a less hardy nature, and are sometimes injured by frosts. They are sown at the latter end of March, and through the month of April, and sometimes in May.

Quantity of Seed.—The oat is supposed to tiller less than most other kinds of corn, but the usual quantity of seed varies from four to five bushels, according to the soil and season. J. W. Jennings, Esq. at Harlington, is an advocate for allowing the greatest quantity of seed to the richest soils, alleging in favour of this opinion, the common practice of sowing six or seven bushels of oats per acre in the fens. Yet the peculiarities in soils, and in the habits of different kinds of corn, should be thoroughly investigated, before any general deductions be made from particular circumstances.

Oats are little subject to fall in wet weather, and
consequently

consequently they are exempted from a danger which attends other thick sown crops ; but the particular gain that may attend the sowing of more than five bushels in general, needs the demonstrative proof of experiment rather than argument.

It may, however, be observed in general, that a too liberal allowance of seed is an error that admits of an easy remedy ; while the deficiencies, arising from various causes, cannot in many cases be either foreseen or supplied.

The tillage of oats, and of spring corn in general, consists in one ploughing, with as much harrowing as is deemed necessary ; and the land is rolled before the corn is capable of being injured by that operation, and thus left in a level state, to facilitate the mowing and other operations of harvest.

Harvesting.—The oats that are grown on clover-leys, or after turnips, or on land which has been pared and burned, are sometimes reaped in the same manner as wheat or rye ; but the scythe is in general employed in this business. It is necessary to cut oats rather before they are perfectly ripe, as they are very liable to scatter on the land, which sometimes happens to the amount of three or four bushels per acre.

Produce.—This kind of corn is more productive than barley, where the soil is suitable, yet perhaps not in proportion to the difference in their average value.

Four quarters of barley, according to the average of the five years which are invariably taken in the calculations, are of equal value with 46 bushels of

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oats ;

oats; yet there is not much reason to suppose that such a produce is often obtained, unless on new or rich soils.

SECT. X.—PEASE.

THIS is the only corn crop that can be used on light lands, with a view of preventing their too speedy exhaustion, and at the same time producing a fair profit for the farmer.

They generally occupy the last year of the course, as in the following: turnips, barley, clover one or two years, wheat, pease; but the pease are frequently omitted, especially on the gravels, chalks, and poorer sands, as their success is very uncertain, unless sown at intervals of nine or twelve years.

Such is, at least, the opinion of many farmers in the southern, or chalky district; but on other soils, this opinion is modified into a different shape. Pease are considered as a hazardous crop in all cases, and the hazard is increased, but not caused, by their frequent repetition. Sandy soils of moderate fertility will often produce tolerable crops at intervals of six years; but light warren sands can never be sown with pease, but with a prospect of loss.

Mr. Humberstone, of Southill, and other farmers, disapprove of sowing pease after wheat, and therefore adopt the singular course of, turnips, barley, pease, clover, wheat. The clover is said to succeed very well in this way, and the pease are, without doubt, a more certain crop.

Manure—Is seldom allowed to the pea crop; and this

this circumstance may therefore be numbered among the causes of their failure. But as the manure is indispensably necessary for the turnip fallows, the evil admits of no remedy.

Drilling and Dibbling.—Neither of these operations are much attended to in this county. Dibbling of pease is seldom or ever practised; and drilling of this kind of corn can scarcely be said to be in vogue, except at the western end of the sandy belt which runs across the county. At other places, such as Luton, and Biggleswade, some of the drillers are so far common farmers, as to confess they have paid too little attention to the subject, to enable them to speak on its merits; though I will venture to assert, that the utility of drilling and hoeing pease or beans, is a point as well established as any thing in the art of husbandry. The town of Bedford presents a singular phenomenon in the history of drilling. The gravelly loams, and friable black mould, which present no obstacles to the use of the drill, are invariably sown in the broad-cast manner, though the most tough and refractory clays on the north of the town, are generally made to submit to the row culture, by the indefatigable perseverance of J. Foster, Esq.

Sort.—There are many kinds of pease, but their respective merits are little known. The horn-grey is sometimes sown in mixture with beans, on such light clays as are not well adapted to the growth of the latter.

They admit of early sowing, and generally ripen about the same time as the beans; but they do not ripen well in moist seasons, continuing sometimes to put forth blossoms till they are cut down.

The Marlborough grey is a common sort on the light soils, and there are several other sorts, such as the Scotch grey, the maple, &c. which are sown by different farmers. The various kinds of boiling pease, such as the common white kind, the early Chaulton, Prussian blues, &c. are not much cultivated, as they are subject to many injuries from insects, bad weather, &c. which often greatly reduces their value,

Time of Sowing.—The horn-greys may be sown in February with the beans; but the other kinds are commonly sown in April, or the beginning of May, in some cases.

The Quantity of Seed—Is from three and a half to four bushels per acre, and the latter quantity is not too much for poor soils.

Drilled pease are generally hoed by hand, and cut in harvest with hooks; but the broad-cast crops are often mown.

The produce is stated by several farmers to be about twenty bushels per acre, on the average of soils and seasons.

The produce of drilled pease, on soils of moderate fertility, varies from twenty to fifty bushels per acre.

SECT. XI.—BEANS.

THIS kind of pulse is cultivated on all the clays and strong loams, but generally in the broad-cast manner.

They are sometimes grown on the black gravels with good success, but never on those of the paler kind, nor
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are they often found on the stony loams of the chalky district. Clays which are light in texture and of a shallow staple, will seldom bear good beans.

The tillage for the bean crop is commonly no more than one ploughing, which is mostly performed in February. If the soil has been well dissolved by the winter frosts, the beans are often covered with the plough, but when it turns up stiff and clung, they are covered with the harrows; as if put under the furrow, there would be much danger of their being *buried*, or imprisoned in the hollows between the furrows, from which the harrows are sometimes unable to release them.

Drilling and Dibbling.—Drilling has been sometimes performed by a small drill fixed between the handles of the plough, with a wheel to run upon the unploughed land, which is connected with the delivering-roller by means of a universal joint. The seed is directed by a piece of tin or leather, to either side of the open furrow; but the most regular rows are obtained by laying the beans close to the angle made by the share point.

Mr. Atterbury, of Hockliffe, disapproves of this mode of depositing the beans, as he observes they shoot directly into a cold clay. Good crops have however been obtained by this method, though the treading of the horses may be supposed to *bury* some of the seed. Sometimes the beans are sprained in every second furrow.

Mr. Foster, of Bedford, Mr. Smithies, of Little Staughton, and a few others, deposit their beans by Cook's drill. In this mode of culture the land is ploughed at any period after wheat-sowing, when the weather

weather will permit, and being pulverized by the frosts of winter, is harrowed or scuffed as soon in February or March, as the weather will admit, and drilled either upon small regular ridges, in the Suffolk manner, or across the high and broad ridges of Bedfordshire. This latter mode has been successfully adopted by J. W. Jennings, Esq. at Harlington. When beans are dibbled, the land is commonly ploughed in the same manner, and the dibblers proceed in rows across the lands, putting two, three, or four, in each hole, and making the rows from twenty to twenty-two inches asunder.

The expense of *setting* is about 10*s.* per acre, and three bushels of seed are commonly allowed. When the labourers manage this business by the bushel instead of the acre, they often shew an undue predilection for bunching, and deposit sometimes *half a peck in a single hole.*

Dibbled beans are seldom hoed more than once, which is performed by hand at an expense of about 8*s.* per acre. The success of this business depends much on pulverizing the ground sufficiently by harrowing, for if the ground be left rough and unlevel, the hand-hoe is often incapable of clearing the weeds from the surface, and never penetrates to any considerable depth.

Seed, &c.—The horse-bean is the only kind in use, and is sown in February and March. The usual quantity of seed is four bushels per acre, but five are sometimes allowed.

Mr. Tyler, of Keysoe, does not think it proper to sow beans till March. He had some this year (1806) that were sown in April, and these were the best beans, though

though on the worst ground ; but this was occasioned by the unusual dryness of the spring.

A few instances have happened, in which early sown beans have been exposed to a frost, which penetrated to the bottom of the tilth, and completely destroyed them.

It is observed of late sown corn in general, that it produces a greater abundance of straw than such as is sown early in the season.

Weeding.—The *spud* is generally employed to destroy the thistles, and a few other weeds in spring corn ; but beans which contain no admixture of black oats, pease, or tares, are generally *sheeped*, as it is termed, or weeded by the folding flock. The sheep seldom injure the beans, and this procedure is undoubtedly beneficial to the crop, by destroying a part of the weeds, but must be regarded as a poor substitute for the use of the hoe, as May-weed and several other kinds can be extirpated by no other means.

Harvesting.—The proper time of mowing beans is supposed to be indicated by the blackness of about one-half of the pods ; as, if they are mown much earlier, a loss is sustained by the shrinking of the corn ; and if they remain till fully ripe, perhaps an equal loss ensues from the bursting of the *kids*, and scattering of the corn on the land.

Beans are sometimes reaped, and tied in sheaves with bean-stalks, or tar cord. A day's work for a man is said to vary from one-fourth to one-third of an acre.

Produce.—The opinions which have been obtained on this subject, vary from three to five loads per acre ; but

but very little gain can be expected from twenty bushels per acre, and fifteen will not pay the expenses on the poorest soils. The average is probably about twenty-three bushels.

Drilled crops are sometimes very productive on good soils. Fifty bushels per acre have been obtained ; but the usual broad-cast crops of either pease or beans, produce little profit to the farmer, unless by the means which they afford of delaying the too frequent return of clover, turnips, &c. which are liable to fail from hasty repetitions.

SECT. XII.—TARES.

WINTER and summer tares are grown in every part of the county, and their importance is generally known and acknowledged.

It is a common observation, that winter tares may be sown to advantage as early as the month of August ; the more common time of sowing them is, however, the latter end of September.

The tare affords an instance, among many others, of the difference between opinion and practice. It is not sown at the latter end of September, because deemed the most proper time for the business, but because the tare, however valuable and desirable for early spring feed, is of less consequence than either harvest or wheat-sowing, and is therefore sown in the interval which occurs between them. If other necessary business occupy this interval, as it sometimes does, the sowing of tares is delayed till the wheat seed-time is over, and even as far as the end of November. The
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spring tare is sown from the beginning of March to perhaps the end of May. It frequently occupies much of the latter month, and often for no better reason than the precedence given to other kinds of corn, which are objects of more apparent profit to the farmer. If the crop is intended for seed, which is seldom the case, two bushels and a half is deemed a sufficient quantity to sow an acre; but if for soiling, three bushels or more will be allowed to advantage.

The produce of seed is very precarious, and the tare, in this view, is much inferior to the other leguminous plants. Thirty bushels may perhaps be obtained, in some instances, from an acre; but 15 is much more common, and is probably near the average of the crops grown in the fallow year.

The seed of the winter tare is in general more valuable than the spring kind; but the price of both is subject to sudden and very considerable fluctuation, and it is difficult to form a satisfactory average.

By the prices of corn at Milton Bryan, it appears that tares (the kind not mentioned) were, on an average, 16s. per load, when beans were 12s. 11d. which is nearly in proportion to beans 5s. and tares 6s. per bushel.

Mr. Pickford, of Market-street, soils many pigs, as well as horses, on tares and clover.

Mr. Brown, at the new farm at Dunton, gives tares to horses, if near home; but mostly to sheep, by turning them into the whole field at once.

Mr. Sutton, of Muggerhanger, sows many tares, to be succeeded by turnips; but does not think the turnips quite so good as if tares had not previously grown on the same land.

At Leighton, Mr. Grant grows tares to great advantage

tage on strong-land fallows ; but remarks, that a clean fallow must be given to such soils every six or nine years, at the farthest.

The quantity of tares grown in the open fields, appears to be very small. In the enclosures, there are few that entirely neglect their use, yet perhaps scarcely any who cultivate this vegetable on the extensive scale of several other districts.

They are chiefly consumed by sheep, which are penned on the land by hurdles, the sheep eating perhaps two-thirds or three-fourths, and treading down the rest. They are often given in their green state to horses, but with little steady perseverance, except by a few of the large farmers, and the bailiffs of some of the principal proprietors. The hay made from this vegetable is esteemed useful for horses ; but repeated rains, while in the field, often reduces the value of it almost to nothing.

It does not appear that the tare has been often sown with a principal intention of manuring the soil, by ploughing it down in its green and juicy state, though there are some who, from a few accidental trials, esteem it very useful in this intention. The tillage consists of a single ploughing ; and the seed is covered by harrowing the land three times over, which is afterwards levelled by the roller to prepare it for mowing. After feeding for a time with sheep, the disposal of what may remain seems rather a matter of accident than design.

If a part is not wanted for the stock, it is perhaps ploughed into the ground, where it will quickly rot, and loosen the texture of strong soils. It is necessary that some should be occasionally saved for seed ; but where the farmer does not think the soil it grows upon nearly

nearly as free from twitch-grass as he would wish, nothing remains but to make it into hay, and clear the ground as fast as possible, to make way for the plough.

The average value of the crop is not easy to ascertain: in one instance I was informed, that some tares on a fallow that afterwards bore good turnips, appeared to be worth 45*s.* per acre, as they supported 108 wether sheep a week on each acre.

The keep of the wether sheep is estimated at only 5*d.*; but if they were well kept, 6*d.* per head is rather a low estimation. In this way of computation, an acre will be worth 54*s.*; yet as there is reason to believe that the crop in question was rather above the average, and as it is thought an ordinary crop will not support a mixed flock of 100 folding sheep for a week, without better management than is often seen, the average value of an acre cannot be supposed to exceed 50*s.* and of this, the seed and tillage will scarcely fall short of 30*s.*

It is a matter probably beyond all dispute, that vegetables are most valuable in a green state, even were the hazard and expense of making them into hay left out of the account, though their principal loss consists of pure water. By experiments made in Middlesex, it appears that the tare loses three-fourths of its weight by being made into hay; but what will the farmers of Bedfordshire think of three tons of hay per acre, value from 12*l.* to 15*l.* in the vicinity of London?

The effect of London manures leaves no doubt that such crops may be obtained; but half of that quantity, at one-fifth of the value, will be much nearer the average of the fallow crops of this county.

It is important for all agricultural writers, to attempt at least to dissipate some of the mists which hang over
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many parts of husbandry, and which frequently mislead both landlord and tenant.

Speaking of experiments, a very sensible farmer remarked, that "such as appear in books are generally made on soils highly manured, or rich in nature; while the experiments on poor soils are generally too unfavourable in their result to meet the public eye. The general consequence is, that erroneous opinions are disseminated of the gains of the farmers, many of whom are meanwhile scarcely able to pay their rent."

When a farmer reads accounts of such shining profits from two or three acres of tares, potatoes, &c.—stolen as it were from fallows, in despite of twitch and exhaustion—which amount to more than he can gain from 20 acres in the ordinary course of husbandry, can it be wondered that a prejudice against book-farming is excited or confirmed?

An introduction of drilling and hoeing into general use in this county, would make it possible to grow tares to great advantage, in numberless instances which, in the present state of affairs, would prove most decidedly injurious to the farmer's interest. Valuable as the crop may be made for the support of live stock, the best farmers will seldom grow tares, where the land is not clean enough to have borne another crop of corn. On light sands the twitch-grass is usually so abundant, that tares before Swedish turnips, or even the English kinds, are perhaps of little positive utility, and frequently productive of an evil, in preventing the extirpation of twitch-grass, which before the next fallow is magnified an hundred-fold.

The tare is one of the leafy succulent kinds of vegetables, which have been presumed to *enrich* the ground rather than *exhaust* it, and which have been grown expressly

expressly for the purpose of manuring the ground. The various kinds of clover, buck-wheat, &c. have been used for that purpose, and as the arguments applicable to any one of them, are equally so to the others, to avoid repetition, it may be proper to consider in this place the whole subject of the manurance by green crops. If tares, &c. are sown with a view to manure and enrich the ground, it is desirable to know the means by which this event must be accomplished. The farmer adds nothing to the soil except the seed, which weighs perhaps 180lbs. and is, supposing its vegetative power destroyed, to be ranked among the most efficacious of manures, but it is certainly one to which no farmer will ever look for profit. A great part of the crop is drawn from the soil by means of the roots, which extend themselves in every direction; but this part, whatever may be its amount, cannot act as a manure to the soil. It was derived from the soil in the first instance, and must be returned to it, or the fertility will be diminished, and by no means improved. It is, however, a well known fact, that every kind of crop contains a quantity of solid vegetable matter which is not derived from the soil, but from the decomposition of air and water, which lose their fluidity, and become constituent parts of the oils, resins, salts, &c. Now, the weight of the seed, and of so much of the crop as is not extracted from the soil, will shew the agriculturist the probable quantity of benefit attainable by the growth of the tare or any other vegetable. But where is this information to be found? This is a path yet unexplored, but which the late Dr. Hales, the ingenious author of *Vegetable Statics*, would have passed with triumph, had not his inquiries ceased almost before the first glimmering dawn of modern science appeared.

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peared. The food of animals, in passing the various digestions, becomes much reduced in quantity; a small part of it passes away in perspiration, mixed with a large quantity of water; some of it forms animal flesh and the various salts of urine, and the rest, by becoming partly animalized, contributes far more to fertilize the soil on which it is laid, than an equal weight of rotten straw. Hence it appears, and which is otherwise known to be a fact, that the manure of sheep feeding on clover, tares, &c. is more than equal to supply the exhaustion of the soil by the growth of the crop, though perhaps a hundred weight of beef or mutton which is formed on each acre, is taken away, and not returned in any shape whatever.

If the growing crop be estimated at six tons, it would produce one ton and a half of hay, which, if rotted by laying in heaps in a moist state, in the usual manner of rick-yard straw and offal-hay, would form an inferior kind of manure, worth not more than two-thirds of common farm-yard dung. And as manures contain much less water than green vegetables, it would scarcely amount to five tons or cart-loads, which would be worth 2*s.* per ton at home, or 3*s.* in the field. Now if the crop be supposed to be worth 30*s.* per acre for sheep-feeding, the manure which they will make in consuming it will be worth 10*s.* and consequently if used as green manure, it ought to be valued at 40*s.* or 8*s.* per ton. But this valuation is nearly three times as much as would be given for common yard dung, and is a sufficient proof of the impropriety of ploughing in green crops, when sheep can be procured to consume them.

SECT. XIII.—BUCK-WHEAT.

THIS has been sown by gentlemen farmers in various parts of the county, and small stacks of it are frequently made in woods and other convenient places, for the use of pheasants, hares, &c. The following observation on the culture of buck-wheat, was made by Mr. Young in this county.

“ At Millbrook and Sandy, I found the spring the common time of sowing this plant : the consequence is, that many crops are killed by the frosts. Where buck-wheat is most largely sowed, it is not ventured into the ground till June, and succeeds very well at the end of that month : thus it affords ample time for cleaning the land.”—*Annals*, vol. xlii.

SECT. XIV.—TURNIPS.

TURNIPS are commonly sown on the sands and gravels of this county ; they are also common on the chalky soils, and are sometimes grown on the light hen-mould clays or woodlands. In the original Report it was remarked, that “ turnips were but indifferently hoed, or the cultivation of them generally neglected, so that 20*s.* to 3*l.* may be said (upon a moderate calculation) to be annually lost upon all the green vegetable winter crops, for want of due attention and management.” But this neglect was probably most apparent in the unenclosed fields. In the only original Report which was returned to the Board of Agriculture from Bedfordshire, I find the following observation by Edward Rudd, Esq. of Biggleswade : “ At Biggles-

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swade, and six miles distance either way, the cultivation of land in general is as well managed, and the crops as productive, as any lands in the counties of Norfolk or Suffolk, containing such a quantity of acres, and the turnips in general have made from two to three pounds per acre more for the last two years, than those in the county of Hertford."

The tillage given for turnips is regulated by the foulness of the land. The sands where the fallow returns but once in six years, are commonly ploughed four times, the first of which is given in winter. Many harrowings are also requisite, unless a scuffler is used, which is not the case in great part of the county. The manure is laid on immediately before the turnip seed time, and if the farmer folds a part of the ground, the rest may perhaps receive fourteen or sixteen loads per acre of dung, but moderately rotted, which as far as is known in this county, or perhaps in any other, is the best state in which it can be applied.

The manure is ploughed in, a few acres at a time, and when the land has been harrowed once over, from one to three pounds of turnip seed are sown, which is covered by a light harrow, which is sometimes, but not uniformly, followed by the roller. Turnips have been sometimes ploughed into the ground in light soils, or sown without any previous harrowing; as to lay the seed deep in the ground, and even to roll the land after sowing, are supposed to prevent, in some measure, the effects of severe drought: but if the soil is disposed to bind, which is rolled, it must be harrowed previous to the operation of hoeing, and the harrowing is far more likely to promote the growth of the crop than to injure it. If turnips are ploughed in they should be thickly sown, as there is strong reason to believe, from

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an experiment in drilling, that such seeds as are covered with soil four or five inches deep, may never vegetate. The time of sowing varies considerably, and includes the whole of June and July, and sometimes even the greater part of August.

English turnips have been sown as early as Midsummer, but these, if not fed off early, become pithy, and seldom survive the frosts of winter; the middle of July seems to be thought the best time on the average. Turnips have grown so much in the late mild winters, that some tolerable crops have been obtained, which were sown as late as the 10th of August; but in some seasons such late turnips have been of very little value. The month of June is preferred for sowing Swedish turnips, but there are few sown till the latter end of that month; and they are sometimes sown as late as the 20th of August, with tolerable success. A want of a due preparation in the soil, is the principal reason for late sowing; but some farmers think they ought not to be sown before the end of June, as if sown earlier, they are liable to be mildewed, and stunted in their growth. The supposed preventatives of the fly, as mixing the seed for a day or two with sulphur, or soaking it in a mixture of train-oil, either with or without flowers of sulphur, have not been tried by perhaps any farmer in this county, neither has the fly been very injurious, at least in this neighbourhood, for some years. Drilling of turnips in the Northumberland or Scotch manner, has been introduced by the Duke of Bedford, and is practised by Lord Ludlow, at Cople; the Duke of Manchester, at Prisley farm, in Flitwick; W. Lee Antonie, Esq. at Colworth; Mr. Fossie, of Houghton Regis; Mr. Runciman, of Woburn, and a few others. This mode has been objected to, on the ground that

much of the soil is of no utility to this crop, as the rows are 26 inches asunder; and Mr. Foster, of Bedford, who has tried it on a clay soil, has discontinued it, under the idea that for the following crops the dung and earth did not become duly mixed.

The advocates of the Northumberland mode, among whom are the Duke of Bedford's bailiffs, assert, that on weighing the crops, the drilled have uniformly exceeded the broad-cast, which is an argument of more importance than any other. Fourteen tons per acre, when the tops and roots are cut off, is mentioned as about the average weight of the Duke of Bedford's crops; but I have not succeeded in obtaining such comparative accounts as are necessary to silence the doubts of the incredulous.

Mr. Runciman, after drilling for some years on the level, gives the preference to the Scotch practice, thinking that it saves one-third of the manure, and is no more expensive than the other way, or the broad-cast mode.

This mode of culture consists in bouting the land with a common plough, or more expeditiously with a double mould-board plough, by which means a kind of furrows are made which receive the manure, of which ten load to the acre is said to be a sufficient quantity.

In carting the manure on the land, one of the hollows serves for a horse-path, and two others for wheel tracks; the manure is thus distributed in three rows at a time. It must be here observed, that the cart must not be let down on the *pummels*, in the usual way, but must be checked by a chain, or some other means, before the *pummels* descend so low as to press against the ground.

The width of the intervals was probably suggested

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at first by the conveniency of passing the cart-wheels along the intervals, but the rows regulated according to this intention would be thirty inches apart; a distance which there is every reason to believe might be lessened to advantage. It has accordingly been found convenient to diminish the width of the intervals to twenty-six inches, without much inconvenience from the wheel-tracks. When the manure is spread, the next operation is to split the former ridges, and cover the manure by reversing the first ploughing; after which the turnip seed is to be drilled immediately above the rows of dung, which hasten and prolong their growth in a remarkable manner. They are hoed by hand in the common way.

The weeds are cleared from the intervals to the width of about fourteen or sixteen inches by the double mould-board plough, and it does not seem that this operation is intended to give the air access to the dung, or the roots of the turnips, though some advantage of that kind is considered to be among the results of hoeing other vegetables.

The expense of hoeing broad-cast turnips varies from 6*s.* to 7*s.* per acre, and two quarts of ale, or a quart of ale per day. The second hoeing, which is seldom given to white turnips, will not cost less than 4*s.* per acre, and a quart of ale; and if most of the surface is required to be mowed, it will cost 5*s.* with a quart of ale per day.

It is generally thought, that turnips ought in no case to occupy less than a square foot of ground, but from fourteen to fifteen inches asunder is thought the most proper distance in common cases.

The Swedish kind, or *ruta laga*, having less *luke*, does not require quite so great an interval as the white

kind, and the rather, as it is seldom sown very early, or on very rich ground.

When turnips are crowded, the bottoms are always deficient, which is a point of more importance than some are willing to believe. Turnips vary in size from two to six inches, without becoming pithy; and as an acre regularly planted at fifteen inches distance, and measuring five inches diameter, may be considered as a good crop worth 4*l.* per acre, the relative value of smaller or larger turnips will appear in the following table.

<i>Diameter in Inches.</i>	<i>Relative Weight of each, or Cube of Diameter.</i>	<i>Relative Value per Acre.</i>
6	216	£.6 18 0
5	125	4 0 0
4	64	2 1 0
3	27	0 17 0
2	8	0 5 0

General distance fifteen inches, or 27,878 per acre.

In the above calculations no attention is paid to the weight of the leaves (or *luke*, as they are called by many), nor to the superior degrees of probability that turnips late sown, and less than five inches diameter, will escape the effects of severe winters.

The price of turnips varies considerably: mention has been made of some sold as high as six or seven guineas per acre, and of others in a plentiful time, or when it was wished to sow wheat after them, as low as 9*s.* or even 1*l.* per acre. The average price seems below 4*l.* per acre. They are mostly fed by sheep upon the land where they grow, but some are drawn for fattening beasts, and the Swedish turnip is sometimes given to store pigs in the straw-yard with good success.

It is not customary to put breeding ewes to turnips,
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under the idea that it causes the lambs to grow too large before they are dropped; and grass is the most proper for ewes and lambs, if it can be obtained. It is very proper to give hay and corn to sheep at turnips, though not very often practised; as the laxative nature of the turnip gives a predisposition to dropsy or red-water, which carries off great numbers of sheep in many seasons.

The practice of drawing the turnips, and carting them on clover-leys, is little known among the common farmers: the expense attending it is evidently very considerable; and it is not known whether the saving a quantity of shells, and other remnants which are left in the common way, may exceed or equal the additional trouble of this mode of management. It seldom happens that the barley crops are injured, in the common way, by their extraordinary bulk, and to carry away the turnips would injure them very considerably.

The Swedish turnip has, within a few years, come into general use, and is much esteemed, on account of its affording a nutritious support to sheep and other animals, as late as the beginning of May; a time when the white turnip has lost its value almost entirely, by running to seed.

Objections have been made to the Swedish turnip, on the score of its breaking out the teeth of sheep and lambs by its hardness; others neglect to sow this kind in the vicinity of woods, &c. as hares are very injurious to the crop, and such as have been bitten do not always survive the severity of winter. There are many varieties of this plant; some approach toward the stalky nature of rape or colseed, with very small bottoms; others appear to be a hybrid kind, between the

ruta.

ruta-baga and the English turnips, and are deficient in the hardness of the former, and the quick growth of the latter.

The ruta-baga is justly considered as the most nutritious kind ; but it ought not to be sown on very poor soils, or late in the season. Its slow growth causes it to come later to the hoe, and sometimes permits the weeds to gain the ascendancy, by which it is necessary to hoe it twice at least. An important advantage, however, attends its use in seasons infested with the fly, black canker, &c. as, if the Swedish kind is destroyed, the white turnip may still be sown in due season.

J. W. Jennings, Esq. at Harlington, drills turnips on the level soil, in rows 22 inches a-part, and one foot distance in the rows. No dung is used, which (says Mr. Jennings) prevents their becoming pithy.

The culture of turnips, like every thing else, is best understood where it is most practised. A farmer told the Rev. Mr. Smithies, of Little Staughton, he should like turnips very well, if it were not for the expense of hoeing them ; and the appearance of a turnip-field in that neighbourhood, which had grown very high without any hoeing, seemed to shew that an experiment was in its progress, to try the merits of a crop in which the distance of the plants was three or four inches instead of fifteen.

SECT. XV.—COLESEED, OR RAPE.

MR. MAXEY, of Knotting, sows coleseed for sheep, and sometimes permits it to stand for seed, which is thrashed

thrashed in the field. Various other instances occur, of the use of this vegetable in the north and east of the county, where it is generally the first crop after paring and burning old sour pastures.

Half a peck is sown per acre, and hoeing is very little in use. Mr. Foster, of Bedford, thinks that "woodland soils, when ploughed up from old grass, or burned, will for many years be capable of producing coleseed, not much inferior to that of the Fens.

"From ten to twenty acres will afford a certain and nutritive maintenance to a very considerable flock of sheep, from November to April; while those belonging to the farmer who has not adopted this mode, will be starving and rotting upon sour, wet, grass-closes. The sheep, in eating the coleseed, will not only enrich, but will impart to the loose woodland that firmness, the want of which constitutes its principal defect. It will then turn up more compact, and rather cloddy, which will less encourage the annuals, and an excellent crop of barley will almost certainly follow."

SECT. XVI.—CABBAGES.

THIS plant has been tried on cold clays without success. Mr. Bithrey, of Bletsoe, has commonly a few acres; and at Houghton Regis I saw a few drilled in the Scotch manner.

His Grace the Duke of Bedford has in general a few acres of cabbages, which possess some advantages over turnips in severe weather, as well as being of double their weight per acre.

The seed is not drilled like turnip-seed; but the plants,

plants, previously raised in a nursery, are transplanted on ridges, which are formed in the same manner as has been described for turnips.

Mr. Young has given the following account of His Grace's cabbages, in the *Annals*, vol. xxxix. p. 440.

“ In 1794, thirteen acres; 1795, five acres; 1796, six acres; 1797, one acre; 1798, four acres.

“ The sorts, drum-head and Scotch, sown in February, transplanted in June and July, in rows three feet by two feet nine inches. Manured 20 loads an acre: soil, sandy loam and clay. The crop very good; used for stall-feeding oxen and cows, and answered the purpose better in frosty seasons, but as good in open weather. Produce and value, greater than of turnips. Lessened the quantity, not because disapproved, but for reasons of convenience.”

Mr. Foster, of Bedford, has “ found great use in three or four acres of cabbages; but as this food is cold and watery, it is well to accustom either sheep or cows gradually to them, beginning with a mixture of some drier aliment.”

SECT. XVII.—CARROTS.

A FEW acres of these have been drilled on the Duke of Bedford's farm at Woburn, in rows of (I believe) 15 inch intervals; but it does not appear that any registers have been kept of their produce, or merits in other respects.

SECT. XVIII.—BEETS, OR MANGEL WURZEL.

THIS plant was introduced into the county some years since, under the name of the root of scarcity, but has now fallen into disuse.

SECT. XIX.—PARSNIPS.

F. PYM, Esq. had a few acres of parsnips last year; but as the bailiff was from home, no information was obtained of their culture or produce.

It is obvious, that a deep-stapled soil is required in the cultivation of either beets, parsnips, or carrots, which entirely precludes their introduction to general use. Their nutritious quality is undeniable; but the ruta-baga makes so near an approach to the same degree of merit, with the additional ones of being less uncertain and less expensive, that it will not be easily supplanted in public estimation.

SECT. XX.—POTATOES.

THE culture of potatoes, which is common in gardens, is, as a fallow crop, almost unknown.

In a few instances, the potatoes have been planted in every second or third furrow, and covered with the plough.

They are planted in gardens, in rows of 18 inches asunder, and five or six inches a-part in the rows.

Manure

Manure is of much importance in the culture of this vegetable; and some people who put manure into drills with the potatoes, prefer to lay it upon the sets, which generally consist of small potatoes, or large ones cut into two or three parts.

The proper size of the sets, and distance of the rows, is a matter of great uncertainty; and the quality of the potatoes, and the degree of alteration which it experiences in various soils and circumstances, is almost equally unknown.

The improvement of the *breed* of potatoes seems to be an object of national importance, as the difference between the best and worst sorts is immensely great.

The experiments of modern times, though numerous and extensive, have been chiefly of a desultory nature. Instead of an investigation of the whole process of vegetation, the views of the experimenters have been generally directed to prove, whether any practice was on the whole beneficial or injurious; hence the neglect of some circumstance apparently trivial, has frequently led to the most contradictory conclusions.

It is still disputed, and therefore remains a subject of inquiry, whether potatoes, cabbages, &c. when carried away from the ground which produced them, leave it in an exhausted or improved state; yet even in the present uncultivated state of agricultural philosophy, it is presumed there are few who think any real improvement can be effected on any soil, by carrying away its produce. It is known that, in the ordinary course of husbandry, many quarters of corn, and many hundred pounds of cheese, butter, wool, and animal flesh, are annually carried away from every farm, and are not returned in any shape whatever. It is equally certain, that the soil is *not exhausted* by this means, as the experience

perience of 6000 years abundantly proves the contrary. The ideas of common farmers are extremely vague on the subject of exhausting the ground, for which reason a more minute consideration of the subject may perhaps be excused.

Suppose 100 lb. of rich garden mould, enclosed in a vessel impenetrable to water, is planted with the crops which are supposed to be most exhausting, as wheat, rye, oats, or barley. Now the weight of these crops when dried, will either be the same as the earth in which they grew has lost, or the difference of weight must be derived from the decompositions of air and water.

The white-strawed crops above-mentioned are supposed to absorb less from the atmosphere than any other, in consequence of which, the manure which they are capable of making, will be less in weight or value than the substance which their growth abstracted from the soil. The ameliorating or improving crops are mostly of a very succulent nature, with large thick leaves, containing much water, and capable of absorbing much atmospheric air and dew, by the contraction of their juices from the coolness of the nights in summer. In this class is included the pulse crops, viz. pease, tares, and beans; of which the general opinion seems to be, that, when seeded, they exhaust the ground much less than the culmiferous or white-strawed crops; and that the manure they make will more than repay the exhaustion, even when their seed is not consumed on the farm.

In the same class are also included all the various species of grasses and trefoils, together with turnips, coleseed, cabbages, carrots, parsnips, beets, and potatoes. It is doubtful, however, with respect to some of the last-mentioned species of plants, as turnips, rape, cabbages,

cabbages, &c. whether the seeding of them is not a direct exhausting process, as their haulm is of such a woody nature, that it is not easily converted into good manure. If any plant be suffered to ripen its seeds, it loses nearly all its ameliorating properties; but of this, the oil-bearing kinds furnish the most indisputable proofs.

The oil itself is considered as the richest of all manures, and as seven or eight hundred weight of rape cake, is considered sufficient to manure an acre of land, when most of the oil has been drawn from it, the efforts of the soil in ripening the seed must have an exhausting effect.

When the seeds of vegetables are approaching toward perfection, their leaves loose much of their juiciness; very little is now absorbed from the air, and the great heat of the summer sun, causes a greater portion of the sap to be thrown off in perspiration. If turnips, &c. are fed on the ground, all parties are agreed, that, leaving out of the account all the good or bad mechanical effects of treading, the soil receives a direct benefit from the process, as the value of the manure which is left in the ground by the turnips, and of that distributed by the sheep when consuming them, will amount to much more than the value of the dung originally brought from the farm-yard.

There are, nevertheless, a few who have raised the outcry of exhaustion against Swedish turnips, alleging, "that they are longer in coming to their size, and suck the ground much, with their long forked roots;" but I have neither seen nor heard of any deficiency of the barley which succeeds them.

The question that remains for discussion appears to concern only cabbages and potatoes, which some few suppose

suppose may be carried away from the ground where they grew without injury to the future crops. This is an opinion that there appears many reasons to discountenance. A good crop of cabbages is said to weigh thirty tons, and a good crop of potatoes, is two bushels to a square pole, or 320 bushels on an acre; to produce either of which, the soil must be well manured, to the injury of some other part of the fallow; and if the soil be not tolerably fertile and friable, such as have tried it in this county affirm, that with a very ample manuring it will at last prove an unprofitable speculation. If cabbages or potatoes will not succeed on clays without an extra quantity of dung, it appears they will *exhaust the dung yard*, if not the soil, either of which suppositions amount to the same thing in the eye of a practical farmer. It is granted that air and water furnish much of the nutritious part of potatoes as well as other vegetables, but unless they derive nearly all their support from those sources, they must necessarily exhaust the ground. It appeared by an experiment purposely made, that common round potatoes contain one-sixth of their weight of *fecula*, or starch. The dry weight of the fibrous matter was not ascertained, but if to this be added the matter held in solution by the water, it would probably equal the weight of the starch. According to the above statement, the acreable proportions, &c. will stand as follows:

A heaped bushel of potatoes weighs lb.	Which consists of two-thirds pure water, or lb.	The fecula, or starch, is lb.	The fibrous substance probably lb.	The total vegetable substance is lb.	A bushel of wheat weighs lb.
60	40	10	10	20	60
320 bushels per acre weigh lb.					107 bushels of wheat weigh lb.
19,200	12,800	3200	3200	6400	6480

BIDS.]

F f

Such

Such as are not convinced that potatoes exhaust the soil, may go far toward proving it experimentally, by planting them repeatedly on the same spot. There is surely sufficient inducement to this measure, if 320 bushels can be procured from an acre without exhausting it.

If the produce is sold at 1*s.* per bushel, the expenses, which are not supposed to amount to 10*l.* per acre, will leave a clear gain of 6*l.* which is more than the farmers of this county expect to gain from a six years course of cropping.

Potatoes are known "to love the taste of new ground," and there is scarcely a cottager in the county, who has planted them three or four years on the same soil, who remains ignorant of their exhausting nature. Some reasons may be assigned, to prove that a crop of potatoes does not impoverish the ground so much as 107 bushels of wheat, but these will be very far from proving they do not exhaust the ground at all, or even more so than any thing which is grown in the ordinary course of husbandry.

Potatoes may, however, be a profitable crop in many situations, care being taken to purchase a quantity of manure which will supply the deficiency which they leave in the richness of the soil. Their market price, of 1*s.* 6*d.* or 2*s.* it should never be forgotten, is not their intrinsic value. A certain quantity is wanted for the use of man, but the intrinsic value of the rest can only be known by converting it into pork, mutton, beef, &c. but experiments of this kind have not to my knowledge been made in this county.

Some people suppose that potatoes are not worth more than 6*d.* per bushel for feeding pigs, but this is probably a low valuation.

The

The arguments that have been advanced to prove the exhausting qualities of potatoes, cabbages, &c. are not intended to discourage their growth, or even the carrying them away from the field where they grew, provided some part of the farm receives the manure made in consuming them.

Drawing of turnips, or soiling animals with tares, clover, &c. are sometimes founded on local reasons, but mostly on the supposition that they will prove more useful to the animals which feed on them, and that their extra value will thus defray at least the expense of their carriage.

SECT. XXI.—TREFOIL, OR CLOVER.

THE name of trefoil, though equally proper for red and white clover as for the yellow kind, is commonly given only to the latter. Clover is much cultivated in this county, and has been common in the chalky district fifty or sixty years. The strong clays (they affirm) have been many years tired with its frequent repetition, and some think the land, as well as the farmer's pocket, is often injured by its use, though, according to the expression of Mr. Golding, of Biddenham, "it is quite a treat to fresh land to sow clover upon it." The red or broad clover, is the kind which is in general use, but where the land has become tired of it, which is shewn by its failing in patches, and bearing scarcely seed enough to pay the expenses of thrashing, the white or Dutch kind has proved a successful substitute. On cold clays which prevail in the north of the county, and several other places, the farmers say it frequently

fails, though never sown before, and the woodland clays have frequently a thin plant in consequence of its being thrown out of the ground by the winter frosts. Red clover is also very liable to fail on peaty or other soils which have been pared and burned. It does not appear that clover is much charged with *tiring* or *sickening* the milder species of clays, where it is sown every four or five years; and Mr. Bennet, of Tempsford, thinks that the failure of clover is attributable to the farmers sowing nothing but offal seed, as he has sown good seed, and experienced no defect where the crop has been repeated four or five times in twenty years.

There is reason to believe that white clover may be sown successfully on land tired of the red, as the wild kind always appears among the red clover on loamy soils in good condition, or on sands which have been well marked. On light blowing sands (according to the experience of Mr. Gresham, of Chicksands, and others), it is useless to sow broad clover, as it will not grow, though never sown in the same place before. The same effect is experienced on the sands of Great Brickhill, in Buckinghamshire, and white clover is substituted with some success. Trefoil, or black-grass, as it is sometimes termed, seems pointed out by Nature as a useful addition at least to the clover crops, as it grows naturally on some clays, as at Wilden, Eyworth, &c. in great abundance. Considerable quantities of this wild trefoil have been sometimes skreened out, in dressing the barley, and sent to London for sale.

The seed is much like the cultivated kind, but Mr. Brown, of Dunton, thinks its quality is rather inferior. There are two kinds of trefoil which grow naturally on the driest sand hills, and a very small kind on the poorest parts of sandy pastures. Clover is generally

sown

with barley where turnips are grown. On the clays it is not unfrequently sown with the wheat; but on binding loams, the harrows will sometimes make too little impression on the soil to ensure a crop. The quantity of red clover sown per acre, varies from 10lbs. or even less, to 20, and the most certain means of obtaining a crop, is to cover it by harrowing and rolling, before the corn with which it is sown has begun to grow.

It may be effectually covered by harrowing, when the corn is four or five inches high; and if the tilth is fine, the harrowing will be useful rather than prejudicial to the corn crop. In some cases the clover is only rolled, either with or without a bush-hurdle hung behind the roll.

The first crop of red clover is generally mown for hay, and sometimes the second crop is applied to the same purpose, but is more frequently seeded or fed with sheep, and it does not appear to be very commonly used for soiling of horses in any part of the county.

The produce of clover depends much on the season. Its growth in the spring is very quick and abundant, but a dry summer checks its vegetation very considerably. The quantity of hay that may be obtained from two cuttings, will vary from two to three tons on rich soils; it is mown as soon as a considerable quantity of blossoms, or heads, as they are called, make their appearance. The process of clover hay-making in dry weather, is very simple, and consists only in turning the *swarths* with rakes twice or three times, according to the farmer's opinion; but such as are more afraid of the loss from bad weather, than the loss of the clover leaves, spread the *swarths* about the ground, and afterwards *hack* it into small rows with rakes, in the usual mode of making meadow hay.

The hay of clover is much esteemed for horses, and in this intention some farmers wish it to heat or ferment as far as prudence will admit, while others think a slight fermentation is sufficient.

The produce of seed, in both the red and white clover, is very variable; it has sometimes proved not worth thrashing; in other instances two sacks per acre have been obtained, though the average of years and soils will probably not reach to four bushels. The *maiden seed*, or that which is obtained after feeding the clover till the end of May, is generally the best in quality; but this is not invariably the case. It seems a general opinion, that feeding of clover is less favourable to the succeeding crop of wheat than either mowing it for hay or seed, as the shade of the clover, it is said, keeps the land moist and friable, and the fall of the leaf enriches it considerably. This opinion is certainly not destitute of plausibility; but some of its defenders appear to pursue their inferences to an unreasonable extent. A certain degree of friability is not only useful, but almost essential, to produce a good crop of wheat; but this effect, some suppose, will be attainable by feeding, if the field be not stocked too hard; but on the supposition that mowing is useful on a strong clay, in a mechanical view, it can possess no permanent ameliorating power, and will be useless, if not hurtful, on the milder soils of every description.

The manure arising from the fall of the leaf, is doubtless beneficial in some measure; but a few hundred weight of leaves is not likely to supply the loss of several tons of hay and seed. It may perhaps remind some people of the thief who stole a sheep, and sent back the skin by way of recompense.

White

White clover and trefoil afford but one crop of hay per annum, with a little sheep-feed, which will account for the comparatively small use that is made of them in this county; but if feeding of the clovers should take place of the present practice of mowing for hay or seed, there is little doubt that they will come into more general use. Trefoil is much preferred by some for sheep-feed, and has been sown in the open fallow fields of Wotton and other places with this intention. Some suppose it to be a useful addition to the crop of red clover, when it is to lie only one season. It fills the deficient places, which too often appear in crops of red clover, and as it does not rise much after being mown for hay, the red clover being thin, will be less liable to be layed or beat down by the rains; a circumstance which is extremely inauspicious to the production of seed.

SECT. XXII.—RAY-GRASS.

RAY-GRASS is commonly known by the plural name of *bents*, in this county. It is in general use in the sandy district, but very little sown in any other part of Bedfordshire.

On the clays this grass has gained little credit. Mr. Thorn, of Eaton, says it is a prevalent opinion, that ray-grass fouls and impoverishes strong ground.

Mr. Harris, of Tillsworth, asserts that it consolidates or hardens clay soils, which is unfavourable to their fertility.

Mr. Runciman, of Woburn, observes, that the ray-grass produces little of any account, except in the early

spring, and if fed bare, so as to prevent the seed stems from rising, it will starve the sheep instead of fattening them.

Mr. Clayton, of Woburn, is of opinion that this grass is unfavourable to the growth of wheat.

Mr. Foster, of Bedford, does not think it improper to sow ray-grass among other seeds intended to lie two or three years, but if used for laying land to permanent pasture, deems it one of "the vilest of weeds." On the other hand, Mr. Smith, bailiff to His Grace the Duke of Manchester, at Kimbolton, sows the ray-grass upon clays as well as the sands of Prisley farm, and is convinced it does not injure the land in any shape whatever.

If the question is to be decided by practice, there are a great majority of votes in its favour on the light soils, though there are a few who sow only red clover, which is broken up for wheat after laying one year.

Upon the gravels there appears to be many who sow no ray-grass, nor any other of what are commonly called seeds, except the red clover.

Bents are never considered in any other light than as auxiliaries to other small seeds; and a proper investigation of the subject, with the aid of experiment, might prove that they have some advantages; and though some disadvantages also attend their use, they seem not unworthy of the attention of the cultivator. The advantages attending this grass are principally two; it furnishes a very early support to sheep in the spring, and will grow on hilly sands, and other barren places, where red clover can never be expected to vegetate, and where white clover, or trefoil, will afford but a trifling produce. In such circumstances, therefore, its use is great and indispensable; but if sandy or other soils are sufficiently

sufficiently rich to produce a full crop of mixed seeds, viz. red and white clover and trefoil, it will be useless to sow bents, or any thing else which possesses not more intrinsic value than the mixed seeds before mentioned.

The nutritious quality of ray-grass is not denied; but I hear of no experiments to prove, whether it be more or less valuable than the red, white, or yellow trefoils or clavers.

On some light sandy land at Great Brickhill, Bucks, it has been customary to sow as far as four bushels per acre; but the common practice in this county is, to allow but one bushel with other seeds, and some who do not like ray-grass, and at the same time are apprehensive of a deficient crop if it is laid aside, sow as little as a peck per acre. I believe Mr. Platt, of Liddington, never omitted the ray-grass, which is also invariably sown on the sandy farms of the Dukes of Bedford and Manchester.

The idea of its exhausting the ground is probably erroneous; but if it should prove true, farmers surely make a very false step in sowing an exhausting plant, with the view of *resting* the soil.

The seeding of ray-grass may be prevented in a great measure, by feeding it early with cattle, or horses. The advocates of this vegetable agree, that it is not friendly to the growth of wheat; but contend, that wheat is not the crop which ought to succeed it.

Oats are evidently the crop most adapted to a soil intertwined, in every direction, with the roots of any kind of grass; but if two corn crops are to succeed clovers or grasses on cold clays, the first may be beans, dibbled or drilled, after which a better crop of wheat will

will be obtained, in all probability, than if sown on the ley after one ploughing.

When sandy soils have been well marled, there is often something which overcomes the supposed injurious effects of the ray-grass, so as to produce a fair crop of wheat; and when a wheat crop fails on light soils, the poverty of the ground is sufficient to account for it, without the aid of any fictitious causes.

SECT. XXIII.—SAINFOIN.

THIS plant is occasionally cultivated by many farmers in the enclosed part of the chalky division of this county. At Hexton, in Herts, I was informed by Mr. Young and Mr. Sowerby, that sainfoin is sown only where nothing else will grow, and no doubt is entertained of its being profitable on poor chalky soils. It will last, with manure, ten or twelve years; but is often destroyed by sheep biting the heads, and by becoming covered with couch-grass. Wheat frequently dies away after it, an effect which farmers often attribute to the wire-worm, &c. but which, says Mr. Sowerby, is in reality owing to the weakness of the ground, impoverished by the long roots of the sainfoin.

At Dunstable, Mr. Queenborough and another gentleman, describe sainfoin as being seldom sown, except on poor thin-stapled chalk, or at a considerable distance from home.

At Luton, I am informed the best way to break up sainfoin is, to manure it for oats, which should be followed by turnips. The roots of this plant extend very deep, and the land is made very light by its growth ;
it

it will last twelve or fourteen years, if not fed too close by sheep; but should not be repeated on the same land within a less interval than 20 years.

Mr. Thompson, of Sundon, thinks that sainfoin should not be permitted to remain more than five or six years, in which case the ground is not exhausted, and will bear it again in five or six years more.

Four bushels are sown per acre; and the quantity of hay obtained, with manuring, sometimes exceeds two tons. The hay is much esteemed; but on good ground, clover seems to be often preferred to sainfoin, as the latter is incapable of sustaining a place in a regular round of cropping.

It is supposed by some, that this grass will flourish on any dry soil; but no instances of its use have been met with out of the chalky district.

SECT. XXIV.—LUCERN.

THE following instances of the cultivation of this celebrated plant are extracted from Mr. Young's *Annals*, vol. xlii. p. 527.

“Mr. Thornton, at Mnggerhanger, Bedfordshire, has a small field in drills at a foot, two years old, which had been cut once, and was near a foot high for a second growth the 25th of June. Mr. Webb, the bailiff, wished for more of it; but observed, it should be on land where there are no springs, as it goes off on wet spots. It is used for soiling. Lady Monnoux, at Sandy, on the fine loamy sand of which the famous gardens consist, has an acre which has succeeded greatly. She drilled it in rows eighteen inches, and
two

two feet asunder ; and when young, drew it to be one foot in the rows. It is a very fine crop, and kept in very clean order by hoeing, weeding, and raking. Upon an average it feeds five horses through the summer ; and one man reaps it, cleans, carries to, and feeds and cleans the horses, &c. This is a large produce, yet is certainly less than it would be broad-cast ; for there is an evident loss of land, besides the expense of cleaning, and reaping instead of mowing. However, it is very well executed in its way, and does honour to the agricultural talents of the intelligent farmeress.

“ The produce cannot well be reckoned less than 17*s.* 6*d.* a week ; and if 8*s.* are deducted for labour, there remains 9*s.* 6*d.* which for 20 weeks are 9*l.* 10*s.*—a great return for one acre.”

It has been many times recommended to sow lucern on common arable land ; but the immense profits which a garden soil and garden culture have sometimes produced, cannot be realized in such situations. Lucern has been cultivated on the small scale of a rood, or half rood, by various gentlemen in this county ; it is sometimes broad-casted and sometimes drilled ; but the circumstance of a crop being in rows, attended even by an inferiority of produce, is far from proving that crops are best broad-casted. In the above extract, Mr. Young displays a partiality for the broad-casting of lucern, but the foundation of this partiality is not to be found in the paragraph extracted. If Lady Monnoux did not gain the *maximum* of produce from lucern plants, one foot by two distant (though this distance produced the great return of 9*l.* 10*s.* per acre), it would be considered by many rather as a striking instance of the great produce which may be obtained
from

from a few roots when kept free from weeds, than as an argument against the drill culture. The few instances of lucern crops which have been seen by the Writer of these pages, were either sown in the broad-cast manner, or received the broad-cast culture (*viz.* none at all), till a few straggling plants, among innumerable weeds, were all that remained to shew where this celebrated vegetable had once flourished.

SECT. XXV.—CHICORY.

A GREAT majority of the farmers in this county, have not heard the name of this plant.

The Rev. Mr. Smithies, of Little Staughton, who has seen some trials of this crop in Suffolk, says, cattle will eat some of it when young; but if permitted to shoot up into high stalks, it becomes dry and worthless. Mr. Young has recorded, perhaps, the only trials made of the virtues of this plant in Bedfordshire.

“His Grace (the late Duke of Bedford) has continued his experiments on this admirable plant, and finds it yields a most ample produce. He has twelve acres in one piece now feeding off with sheep, and it is supporting a very great stock. It was sown in August 1796, on a fallow, twelve pounds per acre, and five pounds trefoil: fed, about Michaelmas, five sheep an acre for a month. In 1797, it kept six sheep an acre, from the second week in April until Michaelmas. Also four acres and a half broad-cast, two years ago (1795), on one ploughing, which kept ten sheep an acre the first year (1796), from the second week in April

April to July 22; and then seven per acre to the end of October; and in 1797, it kept seven per acre.

“Throughout, the sheep have done perfectly well on it*.”

If the sheep-feed is charged 6*d.* per head per week, it was worth 10*s.* per acre, according to the first account, in the year in which it was sown; and in the succeeding year it was worth 3*l.* 18*s.* per acre.

The smaller piece, by the same mode of valuation, amounts, in the first year, to 6*l.* 2*s.* 6*d.* per acre, which is probably a greater profit than is usually obtained from clover; but the loss of a crop of turnips, and of barley, which usually precede other grasses, is too important a circumstance to be overlooked.

SECT. XXVI.—BURNET.

ON the Duke of Bedford's farm at Maulden, I observed a part of the grasses contained a mixture of burnet; but His Grace's bailiffs appear to consider it as inferior to the usual seeds. It is known to vegetate very early in the spring; but no experiments seem to have been made, to ascertain its comparative value in other respects.

* *Annals*, vol. xxxix.

SECT. XXVII.—HOPS.

Sir G. Osborn, of Chicksands, has a hop-ground of four or five acres. There is nothing, says Mr. Gresham (Sir George's steward), peculiar in the management of the hops. The ground is good wheat land; and upon indifferent land it would be useless to attempt to cultivate hops, or almost any other of the plants not in common use.

CHAP. VIII.

GRASS LAND.

THE quantity of land in a state of pasture is not very considerable. In the north, and some other parts of the county, there are several parishes that are almost entirely under tillage, and others contain a quantity of worthless sward, covered with sedge, ant-hills, &c. and producing little advantage either to the occupier or the public.

SECT. I.—MEADOWS.

M^r. FOSTER, of Bedford, observes, that “though the river-side meadows will bear continual mowing, yet it is found that their grass, especially where inclined to be coarse, is greatly benefited by occasional pasturing.

This and proper ditches, are the only modes that have been, or perhaps could be adopted, in favour of these meadows. Nature has given them the benefit of irrigation, and in some parts where there is a regular current from the upper to the lower branch of the river, its effects are most beneficial.”

The meadows of the Ouse are much subject to injury, as well as benefit, from irrigation.

A summer flood in the present year (1807) has reduced the value of their produce very considerably.

Hay-

Hay-making.—"Upon the whole, it may be observed (says Mr. Foster), that hay-making is more carefully and expertly practised in the northern and western counties than in most of the midland, and no where worse than in Bedfordshire. If we were as subject to rains as they are in Lancashire and Cheshire, farmers would find it necessary to adopt a different mode from the careless one here practised."

Some old men in this neighbourhood corroborate this remark of Mr. Foster's, by asserting, that less care is taken of the hay than was practised in the middle of the last century; but if this be a fact, it may perhaps be found to be more a matter of opinion than of negligence; and Mr. Foster, in adverting to the practice, gives also a part of the reasons on which it is founded, namely, the climate of Bedfordshire is not so subject to rains, as are those where a different practice prevails. Another reason for apparent negligence may sometimes be found in the pressure of other business, as preparing the land for turnips, dung-carting, &c. but there are in fact a great variety of opinions and practices to be met with in almost every village of the county.

It is common to *ted* the grass, or distribute it regularly over the ground, immediately after it is mown, and a farmer who I believe was a native of Warwickshire, and lived in this county some years since, is said to have been so careful in this respect, as to cause the hay-makers to distribute the grass very regularly, by scattering it with their hands instead of forks, by which means the expense of that operation was increased at least fourfold, without any very apparent advantage.

The grass commonly remains distributed over the whole surface of the ground till its colour is considerably changed, which generally happens in some

part of the next day after it is mown, and sometimes in the same day, if it was distributed early in the morning. The second operation upon the hay, consists in turning it with forks, or more commonly in raking it into small *windrows*, about a yard asunder, and if the weather be fine, these rows may be turned over with the rake some hours afterwards.

In this state the grass frequently remains till the next day, in the morning of which, as soon as the dews are evaporated, it is thrown into long narrow *beds*, and turned as many times as may be deemed necessary, after which it is *put in*, as it is termed, or laid in double rows, and immediately carted to the stack.

The hay that is made in the manner here described, costs the farmer in this operation, perhaps not more than half as much as in Middlesex; and whether the extra expense in the latter county is paid in the superior excellence of the hay, is the point in dispute, for the decision of which it is not easy to offer any satisfactory arguments. The attention which is paid to the hay, depends on many circumstances, and it is probable that those who have many hay-makers, and little other business to occupy their attention, are most solicitous with respect to their hay, and bestow the most labour upon it.

To move the grass very frequently, is undoubtedly a means of getting it fit for the cart more early than the more careless method before described; but even this may be carried to such excess, as to defeat its own purposes. To turn the dampest or greenest side of the hay downwards, may be invariably considered as labour misapplied, yet this is sometimes done for want of other employment. There is much reason to believe that both cloyer and grass, is as powerfully acted upon
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by the sun and wind when in the state of small *hacks* or *windrows*, as in any other form, and is certainly more easily turned with a rake than by a fork. It is said to be customary in Middlesex and other districts, to make the small windrows into grass cocks, to preserve the hay from the bad effects of rain and dews, and this is also practised by many in this county, though perhaps less than formerly, except when under an apprehension of rain near at hand, in which case it is seldom omitted. The bad effects of dews upon mown grass, are little known, and therefore little attended to. It is probable indeed, that some injury may arise from this source, but its amount is apparently not very great, and as the dews principally affect the surface of the hay, it is obvious that this is very little diminished by making the hay into small cocks, unless the numerous intervals be raked clean, which is seldom the case. The benefit of cocking hay in fine weather, unless it be nearly ready for the cart, appears to me very doubtful. It is common to leave hay-making in ordinary cases at six o'clock; one of the effects of leaving it *cocked*, is therefore to counteract much of the influence of the sun for two or three hours in the evening, and a similar consequence ensues the succeeding morning, if circumstances should hinder a very early attention in the spreading it abroad. A careless hay-maker will therefore gain an advantage in this way, whatever he may lose in other respects.

Some people are extremely anxious to break every green *lock* of hay, and seem dissatisfied if a score of blades of grass find their way to the hay-rick in the same relative position, and nearly in the same colour in which they grew; but I believe no ill consequence have ever arisen from that source. If hay be made into

very large cocks (when in a state that would render it dangerous to carry it to the stack), and be left for some days in that situation, it is supposed that any danger from its subsequent fermentation would be obviated, and that the hay would possess more of its natural verdure when cut from the stack in winter; yet the advantage or disadvantage of this method is not practically known, and though there are many who bestow much commendation on green hay, there are others who think that hay which has not received what is called a good heat, is of very little value.

Hay that is become brown by excessive heating, is deemed more adapted to the use of horses than milch-cows; but I have not found any competent authority on which to ground an opinion, that a violent fermentation is of any utility, even to horses.

The usual price of mowing grass per acre, is from 2*s.* 4*d.* to 2*s.* 8*d.* and a quart of ale per day.

Meadows, as before observed, will bear constant mowing, but the upland sward is mown and fed alternately, when other circumstances will permit, by which means, the injury which is sustained from the former practice, is counteracted by the ameliorating effect of the latter. In the original Report it is observed, that "farms consisting wholly of pasture and meadow land, must necessarily be impoverished, because a certain quantity must be every year mown, and an adequate return of manure cannot be made for the injury done by the scythe." This opinion ought not, however, to pass without remark, as in the idea of some, it is founded on a fallacious theory, and is utterly at variance with facts.

It is a frequent custom, when the soil will admit of it, to consume the hay in the close or field where it grew,
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in which case the exhaustion of the soil is not supported by theory or fact. It is true, that perhaps 150 lbs. of butter, pork, &c. may be derived from each acre, for which loss no return is made in manure, or otherwise, but the invisible manure, that silently and constantly descends from the atmosphere, is found sufficient to supply this loss.

SECT. II.—PASTURES.

A FARMER in the north of the county, remarked that it had been said (I believe in print), that Bedfordshire contained no land sufficiently rich to fatten an ox; but though this assertion is to be considered as very erroneous, the county is certainly not remarkable for rich feeding land.

Some of the pastures in the south west of the county, have been lett from 50*s.* to 60*s.* per acre; though much of the grass land is worth only from 20*s.* to 30*s.* per acre; and Mr. Wilson, of Ravensden, observes that a milch cow will scarcely maintain herself in tolerable condition in that and several other parishes in that part of the county. The principal towns from which any considerable quantity of butter is sent to the London market, are situated within a few miles of Amptill and Woburn.

Sheep Pasture.—Sheep and lambs are often fattened in small quantities among other cattle; but there are many farmers, particularly the occupiers of poor woodland clays, that appropriate a part of their sward entirely to the support of folding sheep; and they

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assert, that their arable land cannot be made to produce a tolerable crop of wheat under any other system.

Several agricultural writers condemn this mode of management, as injuring the pasture land; and recommend, on the other hand, to manure the pasture to the injury of the arable fields from which the manure is derived: but farmers will always pursue what they deem their own interest, and the interest of the farmer (who is not about to leave his farm) will invariably coincide with that of the public.

It is thought, that a poor soil will more amply repay a liberal than a scanty manurance; the propriety of their conduct rests, therefore, on the supposition (which may probably be well founded), that tillage fields suffer more from a partial starvation, or neglect of manurance, than others in a state of pasture.

The general expenses of a poor crop amount to nearly as much as a good one; consequently, in the rotation of fallow, barley, beans, and wheat, the farmer who suffers a deficiency in each of these crops to the amount of a trifle more than three bushels, loses exactly *all* his expected profits.

The sheep pastures in general exhibit the appearance of extreme poverty, and differ not from the sheep commons in unenclosed parishes; yet their produce, though scanty, is found essentially useful in providing manure for the adjacent corn-fields.

There is a remarkable distinction between arable land and pasture; the former may be so far exhausted as not to be worth ploughing in a very few years, while the latter can only be impoverished to a certain degree in as many centuries. The influence of the atmosphere, added to the decomposition of water, and the remains
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of vegetable and animal substances which cannot be carried away, will be found competent to produce that quantity of grass which is found on *old commons*, and of course, exhaustion cannot be carried farther than that point.

The general rule which is acted upon by every considerate cultivator is, to lay the manure in the field where it is likely to afford the greatest produce; and it cannot be denied, that the inclination of the farmers in this county leads them to manure the arable land in the first instance, and leave the pasture rather more under the dominion of chance; though it is probable, that such as have plenty of manure, lay as much of it on the sward as it has contributed to produce.

The breaking up of grass land has been practised of late years to some extent, particularly in the north and east of the county, and paring and burning is commonly the first step in the business; but there are still remaining considerable portions of coarse sward, producing scarcely any thing but sedge, and other rubbish, which no animal will eat, and which the tenants are restricted from ploughing, though many an open-field common is far superior in public utility to such enclosures.

Mr. Foster makes the following remarks on this subject: "Upon woodland soils I have not myself had any experience, and can only venture a few remarks grounded upon my observations, and the trials of others. There is certainly no part of the county that stands so much in need of amendment; and though little has yet been very successfully attempted, it would be wrong to conclude that their defects are not capable of remedy. I have been told that lime, which abounds in the north-west of Bedfordshire, has been used in the

south-west of Northamptonshire upon similar woodlands, with wonderful success. Here it has, as far as I know, been no where tried upon them. It also seems probable, that, as they are cold in nature, deep ditches, and plough-draining the furrows, could not fail of being beneficial. The use of the drill might also tend to destroy some of the annual weeds, here so abundant and pernicious.

“ But there is another mode whereby most woodland farms could, with the consent of the land-owner, and the exertions of an improving tenant, be ameliorated to a much greater degree. These farms consist in part of arable, where poverty and abundance of weeds rarely admit of a good crop; and partly of grass, of a coarse, sedgy, unprofitable nature; the whole surface being more or less over-run with ant-hills, and the furrows cankered with stagnant wet from November till May. If these ant-hills are levelled, or, as we term it, *banked*, and the earth spread about, the grass is covered so thick with bad clay, that it does not recover for years; to prevent which, some bank only about one-third part of the ant-hills in each year, till the whole is completed. If the ant-hills are carted off, laid in a heap, and brought on again when rotten, the effect will be much better, though with a great increase of labour. In either of these ways, the places where the ant-hills were will be very poor, and become but slowly covered with an indifferent herbage.

“ What I would in preference recommend would be, after the needful drainage, to plough up the whole *close*, either with or without breast-ploughing, and burning at the same time, laying down at least an equal quantity of the arable, which, by a period of rest and pasturage, would be greatly improved.

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“ But after burning, or, indeed, any ploughing up of the grass land, all will depend upon not exhausting it with too many successive grain crops. One in two years will produce as much corn as the weak nature of the woodlands is capable of. The abundance of straw, and consequent manure, produced by fresh land, will afford the means of nourishing the part of the farm before arable, but now converted into new ley. In the intervening years between the corn crops, the burnt land will be no less profitable to the farmer, while itself is benefited by being put into tares, turnips, cabbages, or, preferably, coleseed. Woodland, when ploughed up from old grass, or burned, will for many years be capable of producing coleseed, not much inferior to that of the Fens. From ten to twenty acres, will afford a certain and nutritive maintenance to a very considerable flock of sheep from November to April; while those belonging to the farmer who has not adopted this mode, will be starving and rotting upon sour wet grass-closes. The sheep, in eating of the coleseed, will not only enrich, but will impart to the loose woodlands that firmness, the want of which constitutes its principal defect. It will then turn up more compact, and rather cloddy, which will less encourage the annuals, and an excellent crop of barley will almost certainly follow. Thus each part of the farm will assist the other, and in time, the face of the whole will be totally changed.

“ It is to be observed, that burnt land will not soon again turn to good grass; if, therefore, in breaking up old grass land, it is intended soon to lay it down again, it is better to plough it up without burning.”

Laying Land to Grass.—This has not been practised

tised to any extent in Bedfordshire ; there are, however, a few considerable instances of it, as at Lidlington, Marston, Bedford, Harlington, &c. The ray-grass was used to the amount of one bushel per acre, in laying land for pasture at Lidlington ; but Mr. Platt thinks, that half a bushel with white clover, and a little red, would be preferable.

At Marston, a good deal of ray-grass was used, and the sward is likely to be good ; a circumstance that is evidently more owing to the fertility of the soil, than the merits of the ray-grass in this intention.

Since the enclosure of Bedford, a quantity of land has been laid to grass for the accommodation of the inhabitants of the town ; and Mr. Foster is pursuing the same plan on his estate in this parish.

This gentleman, who has favoured the Writer of these pages, and the public, with observations on the principal parts of agriculture, depends principally on the white clover in the formation of new sward, and considers the ray-grass, when used for this purpose, as " one of the vilest of weeds."

In one of the fields, in which no grasses were sown among the clover, the natural grasses that began to appear in different parts of the field, exhibited a distinction that may perhaps be found worthy of mention. " One part of the field was a wheat stubble, which was sown chiefly with trefoil ; the other part contained more white clover, and was sown down upon sheep-fed rye in June." The natural grasses that appeared after rye, were principally those which produce a small blade of a bright green colour ; but those which succeeded the wheat, were mostly of a coarser or more luxuriant kind. I cannot ascertain the kinds of grass, and shall only observe, that those which produce the largest

largest leaves, and which exhibit a pale blue cast, are the meadow foxtail, cocksfoot, the oat-grasses, Yorkshire-grass, creeping soft-grass, and couch.

Mr. Jennings, of Harlington, has cultivated natural grasses twelve or fourteen years, having first selected them with his own hands for the purpose of laying a quantity of land to sward. He has omitted collecting them from the new sward only two or three years in that period, and has cultivated on the whole about 150 acres in this manner.

In the opinion of Mr. Jennings, the meadow foxtail (*alopecurus pratense*) is superior to all other cultivated grasses; its foliage is abundant, and contributes much toward the bulk of the crop; and as the spikes or seed stems are not refused by cattle, the apparent quantity in pastures which are fed, is not so considerable as the real one. Mr. Jennings reaps the foxtail wherever a few of the stems are near each other, and the mixed grasses which remain are afterwards mown and thrashed. This seed is considered to be ripe as soon as the top of the spike turns of a pale or whitish colour, and is said to occupy more room when thrashed, than in the state in which it is taken from the field. A cart-body filled with the reaped foxtail, will produce sixty bushels, which may be procured, on the average, from four acres of ground, including the mixed seeds. The foxtail does not, however, continue to throw up seed stems in any considerable quantity for more than two years, unless it be drilled and hoed; in which case there is no reason to believe its produce would fail.

The following observations on natural grasses are interspersed with some remarks by the Rev. Dr. Abbot, of Bedford.

Meadow

Meadow foxtail (*alopecurus pratensis*). "It has been observed upon this grass, that it suits low meadows, or such as have been newly drained; it is admitted on all hands to be a staple article in the composition either of green fodder or hay: in early seasons, it blooms in May, and seeds in June."

This grass may be known by such as do not understand botany, by the seed spike, which is soft and round, and rather thicker and shorter than that of the field foxtail, or land grass, and is as valuable as the latter is prejudicial.

Crested dogtail (*cynosurus cristatus*). This grass may be known by the stem being visible on one side to the top of the seed spike. "Its produce of leaves is minute and delicate; the spike and stem are harsh and dry; it flowers and seeds, according to circumstances, in June or July."—Pastures that are fed with sheep, in which this grass abounds, would frequently afford a considerable quantity of seed, if proper care was taken to collect it.

Meadow catstail (*phleum pratense*). "This is a hard grass, and unfavourable for pasturage or hay."—Its seed spike resembles that of the foxtail, but is more rough and hard in its texture.

Rough cocksfoot (*dactylis glomerata*). This is a coarse grass, and appears to bear abundance of seed in its bunchy and heavy flowering heads.

It has been recommended to supersede the use of ray-grass in the convertible husbandry, but it seems more adapted to mowing than feeding, unless fed very close and early.

Meadow barley-grass (*hordeum pratense*). "This is one of our hay-grasses most productive in its crop." It is supposed to be injurious to cattle, from the rough-

ness of its awns, and is commonly found in cold clay pastures.

The smooth, and rough-stalked meadow grass (*poa pratensis*, and *poa trivialis*), and the various kinds of fescues (*festuca pratensis*, &c.), are useful grasses; but Nature will provide these, and most of the other kinds which the soil will produce, without the aid of man.

Sweet-scented vernal grass (*anthoxanthum odoratum*). This is an early grass, and contributes much to give an odoriferous smell to hay, where it abounds, It is, however, dwarfish in nature, and seems rather to affect poor dry pastures.

Sheeps fescue (*festuca ovina*). This is the black twitch-of Bedfordshire; its leaves are bristle-shaped, and of little value.

Meadow oat-grass (*avena pratensis*), was tried by the late Duke of Bedford, and disapproved; such was also the case with the meadow soft-grass (*holcus lanatus*), or Yorkshire grass; and some ground has been lately broken up, in which it was used for laying to pasture. "A plant so redundant with down approaching to woolliness, bespeaks a sort of pasturage unwholesome to some cattle, and unpleasant to others." It appears to differ from the couch of light soils (*holcus mollis*) in no respect except in the want of a creeping root.

The corn brome-grass (*bromus arvensis*), appears to be what is called the lob-headed bent, the seeds of which are deemed considerably to injure a sample of ray-grass.

Ray-grass (*lolium perenne*). This grass, which Mr. Foster, of Bedford, deems "one of the vilest of weeds," when sown on land intended for permanent pasture, is generally used for that purpose in every part of the county;

county; yet doubtless for no better reason than the great expense of purchasing natural grass-seeds, the difficulty of procuring pure unmixed sorts, and the defect which has been sometimes experienced in their vegetative powers. Mr. Foster made use of a considerable quantity, but they did not vegetate sufficiently to give satisfaction, and therefore that gentleman's subsequent trials have been made entirely without grass-seeds, which is a method that he most approves. It seems, however, that the practice of sowing such seeds as the ground is naturally inclined to produce, cannot possibly fail to prove beneficial, as these will be increasing rapidly by seeding, &c. at the time that ray-grass would be dying away, and yet resisting the growth of more valuable grasses. It is customary for the proprietors to allow white clover, &c. when land is to be laid to permanent pasture; and it may be presumed, that an intelligent tenant would feel no objection to pay the interest of any money expended by the landlord, in the purchase of natural grass seeds, which would probably double the value of the product, from the third to the sixth year after laying to pasture.

But the ray-grass ought not to be indiscriminately condemned. Mr. Jennings, of Harlington, believes the ray-grass is as good as most of the others, on soils where it is naturally found, though injurious in all other situations. Mr. Brown, at the new farm at Duntun, observes, that ray-grass need not be sown among clover, as it grows spontaneously on many parts of that farm.

A small quantity of ray-grass may be found in many old pastures, but it appears to be a more diminutive kind than the sort usually cultivated. It abounds particularly

ticularly by the sides of paths, and other places where the seeds are covered by treading, &c.

The objections which are made to sowing hay seeds, are, perhaps, carried rather too far. It is true, that much rubbish is thus sown with the natural grasses; but it is perhaps not impossible to separate many of the seeds that are not approved, and others will appear in every pasture, whether sown or not. The crowfoot is found in almost every kind of pasture; various kinds of plantain, dandelion, hawkweed, &c. affect dry soils; and a variety of plants of the hemlock, and other umbelliferous kinds, grow near hedges, which often vegetate unmolested, because the means of destroying them are unknown; a circumstance which depends on their propagation by seeds, or by perennial roots.

The grasses and weeds that are indigenous to various soils, will be found eventually to prevail, whatever kind may be sown.

The couch-grass (*triticum repens*), though pernicious in new pastures, is unable to resist the natural grasses for many years. Sedge-grasses (*carex acuta*, &c.), which are natural on cold, wet, sour pastures, need no sowing; but if they owe their support to natural acidity, the use of lime would probably destroy them; as this substance, in its caustic state, would be converted into gypsum, if it met with the vitriolic acid, which abounds in some clays.

CHAP. IX.

GARDENS AND ORCHARDS.

THE gardeners of Sandy and Girtford have been long celebrated in Bedfordshire, and the adjacent counties, for the excellence and abundance of their culinary vegetables. It does not appear, however, that any particular process is employed, which is not known to all professional gardeners.

The soil of the vales is a deep sand, of a yellowish brown colour, and appears to be composed of smaller grains than is the case with most other parts of the sandy district. The depth of the soil is obviously an essential circumstance to the successful growth of carrots, and other tap-rooted vegetables. It permits the fibres to extend with great facility in all directions, in search of the vegetable nutriment, and a free exit is provided for the superabundant water in case of heavy rains, which would otherwise, by its coldness, operate as a severe check on the growth of vegetables. On the other hand, the smallness of the grains of which the soil is composed, diminishes its pores without destroying its friability, and retains a greater quantity of moisture, in a dry time, than other sands, in proportion to its internal surface.

On the whole, it is obvious that a deep fine-grained sand, the pores of which are still further lessened, and its attractive power on the atmosphere increased, by the addition of a certain quantity of clay and oxyde of iron,

iron, is a soil, on which gardening as well as agriculture in general, can scarcely fail of success. The soil in some parts of Potton, is little inferior to that of Sandy, as appears by the mention which is made of carrots four or five inches in diameter.

A portion of good garden ground is also met with in various other places where the sandy soil prevails in low situations, as at Biggleswade, Campton, Clophill, Maulden, &c. The following are answers to some queries which were made several years since by Sir John Sinclair, on the subject of the gardens of Sandy.

“ 1st, Gardening has been carried on at Sandy for time immemorial, but increases considerably. 2nd, The number of acres are yearly three score and upwards. 3d, The rent per acre is supposed to be from 2*l.* 10*s.* to 3*l.* but sometimes the farmers lett some of their tillage lands (having previously folded or manured it) at a higher rent. 4th, The articles principally produced are green pease and beans, cucumbers, potatoes, parsnips, and carrots, radishes, cabbage plants, and turnips, which are sent to markets in all directions to the distance of sixty miles, and perhaps sometimes still further. 5th, Not tithe-free at the time the queries were answered.”

I am informed that at Biggleswade, a field when manured and cleaned, has been lett for one year to grow potatoes and onions, for 5*l.* or 6*l.* per acre.

In the cottage gardens, the potatoe is more cultivated than any other vegetable. The small potatoes are commonly set without cutting, but the large ones are divided into two or more parts.

The rows are seldom ventured farther a-part than eighteen inches, and the produce is in general about two bushels per pole, unless the ground has been tired

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with frequent repetitions of this vegetable. Some people dibble garden beans in the rows of potatoes or other crops, and they are observed to yield well, as being set at a foot a-part, or perhaps eighteen inches; the air, light, and heat, have free access to the stalks, and contribute much to their fruitfulness. The practice of sowing onions in drills of six inches wide, is used successfully by several cottagers; and there seems much reason to believe, that breaking the encrusted surface of the ground, and keeping it in a pulverized state, is beneficial to the growth of most kinds of vegetables, independent of the facility with which weeds may be destroyed by the hoe; in preference to the hand-weeding, which is commonly in use.

The gardens of cottagers and others, mostly contain gooseberry and currant trees, of which they sometimes make some profit among their more opulent neighbours.

Orchards are in general very small in this county. There are a few that may contain 100 fruit trees of various kinds, and new ones of an acre or two may be occasionally met with, planted sometimes in squares of about seven yards between each tree, but there are frequently no other orchards than what are included in the gardens, consisting of four or five trees. Cherries are most plentiful in the south of the county, but in Mr. Marsh's papers there is mention of cherry orchards at Warden, Great Barford; and Goldington. It is remarkable, that more attention is not paid to the production of fruit by the proprietors of estates. No doubt is entertained that trees of all kinds injure either the herbage or the garden vegetables where they grow, but the value of their fruit is probably ten times as great as the amount of their injurious effects.

In planting trees of all kinds, the equiangular form
should

should be preferred, as by this means the ground is nearly all occupied by the roots or boughs before they begin to mingle. The effect of this mode of planting may be illustrated by placing seven, or any other number of circular bodies in contact, thus :



The ingenious author who recommended this mode of planting, in a paper printed in a late volume of the Society of Arts, terms it the hexagonal form ; to deserve which name, however, the central tree ought to be omitted.

CHAP. X.

WOODS AND PLANTATIONS.

SECT. I.—COPSE WOODS.

“ THE improvement of this species of property has not been much attempted, and it does not appear that any material experiments have been made, in order to ascertain the comparative advantages to be derived from the cultivation of different kinds of timber and underwood, or in selecting such sorts as are best adapted for the most immediate uses of the country. The woods or woodlands, consist chiefly of oak timber, and any kinds of rude underwood that by chance may spring up under it, so that it is not unusual to see thorns produced where a more valuable crop might have been cultivated; it not being an object of general attention, at every fall of underwood which is cut at about twelve or fourteen years growth, either to root out such productions as are the least profitable, or to fill up the vacant places with a better stock.

“ It is not unusual to observe in the woods, considerable quantities of land, either quite vacant, or producing a small crop of any thing; indeed, so inconsiderable is the crop of underwood, in the estimation of some persons who have had the management of woods, that instead of felling the necessary timber at the time the underwood is cut, they have returned years afterwards

wards to cut more timber, throwing it down upon such of the young shoots of the underwood as were produced, which, if a tolerable crop, would be greatly injured by such means, and also by the conveying it away.

“Particular instances have occurred, where a large quantity of timber has been produced in high perfection, where the trees have been very thick, with but little foliage; but it has been in those situations where the soil is extremely deep and rich, making amends for the exclusion of a very considerable part of the atmospheric nutriment, which, on soils less fertile, is absolutely necessary to be imbibed by the plants for their health and support. If the oak has space for the branches to expand themselves, fifteen trees, containing on an average from 80 to 100 feet of timber each, will cover an acre of ground.

“And unless, as in the case before stated, the trees have sufficient room for the expansion of their branches, their growth will be impeded in proportion as they are cramped. Thin stapled clays of a low quality, such as are found in the west part of Huntingdonshire, and the high parts of Cambridgeshire, and north parts of this county, now lett under 10s. per acre, are probably well adapted for the production of timber and underwood; and upon the poorest cold soils of this county (though the quantity is small), timber and underwood should be continued where found, and improved on land where it is planted, and similar soils might be converted into wood-land to great advantage.”

Thus far I have extracted from the original Report. But I consider the quantity of Woodland mentioned in page 10 of that Report, as a very erroneous statement. From an enumeration of the acres in each of the principal woods, with which I was favoured by

the Rev. Mr. Marsh, with due allowances for deficient accounts, it appears that the true quantity is about 7000 acres, or less than one-third of the original statement.

The woods are found almost invariably on the slopes of the hills, which consist of cold, marly, woodland clays.

A considerable portion of them occupy the hills which extend from Ampthill towards Blunham, between the sandy district and the vale of Bedford. After an interval of some miles they again make their appearance on the western side of the vale, at Holesat and Marston, and from thence are dispersed over the whole north west of the county.

Wood is very scarce in several places in the south and east of the county.

The management of this necessary article presents nothing very peculiar; the underwood of a few small copses is sometimes left with the farms, but nearly all those of any considerable extent, are under the care of agents appointed by the respective landlords. The underwood and timber are felled late in the autumn, and a day of sale is appointed in the course of the winter for the disposal of the former, which consists principally of hazel, and a few ash-poles, which are used, according to circumstances, for hurdles, hedging, and fire-wood. The underwood is commonly sold in divisions of ten poles each, the felling of which by the woodmen costs, in some places, 7*d.* with a good ash or hazel pole, which is termed a *crutch*, which the workmen claim for each day's work.

The value of wood varies not a little from its situation. If the subsoil is either a limestone, or ferruginous sandy rock, into which the tap-roots of the
timber

timber and other wood find no access, the vegetation is necessarily checked, and there are instances of both in this county.

Woods are sometimes cut at twelve years' growth, but fourteen years is the usual period, and is, on every account, the most proper for obtaining a due size in the poles, and lessening the general expenses.

The value of the underwood per pole varies considerably. From 6*d.* to 2*s.* per pole, or from 5*s.* 8½*d.* to 1*l.* 2*s.* 10*d.* per acre per annum, will perhaps scarcely reach the extremes; but 15*d.* per pole will be near the average value.

Some woods, such as Marston-thrift, are often so inaccessible in winter, on account of the deep miry clay with which they are surrounded, as to lessen materially the value of the produce. 9*s.* 6*d.* with victuals and drink for the carters, was lately paid for the carriage of ten poles of wood a distance less than three miles, the original cost of which was no more than 7*s.* 6*d.* The value of the timber per annum is an article of great uncertainty. Some of the woods toward Chicksands, I am informed, frequently produce timber and underwood to the amount of 2*l.* or more, per annum, the soil of which is probably not worth 1*l.* per acre; but the space occupied by the ridings, and the various attendant expenses, considerably reduce the gross amount of the sales, before it arrives to the possession of the proprietor.

The following table shews the produce of three of the woods belonging to His Grace the Duke of Bedford, on an average of three years.

<i>Woods.</i> No.	<i>Average Produce in Three Years.</i>			<i>Average Produce in Three Years.</i>		
	<i>Timber and Bark.</i>			<i>Underwood.</i>		
1.	£.8	0	0	.....	£.8	0 0
2.	10	0	0	.....	10	0 0
3.	10	0	0	.....	13	0 0
Average, ...	9	6	8	.....	10	6 8
Total,	19 13 4					
Gross product per acre, ...	£.1 8 1					

Mr. Salmon, His Grace's agent for the woods, thinks that 10s. per acre per annum for the underwood, and the same for the timber, is nearly the clear yearly value of woods of an average quality.

SECT. II.—NEW PLANTATIONS.

“ In the western part of the county, the Earl of Upper Ossory, and Francis Moore, Esq. have within the last twenty-five years made some very considerable improvements, by planting light sandy land with trees. Their plantations consist chiefly of mixtures of the fir tribe; and it appears, although in the outset, ornament engaged a considerable share of their attention, that such plantations have turned out extremely profitable.

“ His Grace the Duke of Bedford is planting and beautifying many hundreds of acres of barren and waste land, in the neighbourhood of Woburn-abbey, which is laid out with great taste, and I doubt not will turn out in every respect beneficial.

“ Lord Carteret has raised some very ornamental plantations near his seat at Hawnes; and I am of opinion,

nion, that when the improvements his Lordship is carrying on, are complete, nothing will remain upon his estate to be performed, which art can effect."—*Original Report, 1794.*

Lord St. John has planted a considerable quantity of ground in the vicinity of his seat at Melchbourn.

In these plantations, which consist of ash, oak, &c. potatoes are frequently grown, with the intention of cleaning the ground by hoeing. The exhausting nature of the potatoe is an indisputable fact, yet I observed an evident proof that couch-grass is still more exhausting, as the leaves of the trees amongst which no potatoes were grown, looked yellow and sickly, while those which received the benefit of the hoeing and digging the ground, looked very flourishing and healthful.

Small plantations of ash have been made at various places, as at Duntun, where there is a kind of a belt a few poles wide, which extends to a considerable length, and forms, I believe, the boundary of the estate of Earl Spencer.

In making this kind of plantation on wet or peaty soils, it is common to plant a double row of ash upon banks a yard wide, which are made by digging ditches of nearly that width between every double row of sets.

The trees are nearly three feet asunder both ways, and where the soil was only an imperfect peat, the produce of poles is very considerable in a few years. But where the soil is strongly impregnated with the vitriolic solution of iron, which abounds in the bogs of the sandy district, no tree can be made to vegetate; and where the impregnation is less abundant, the trees will be stunted in growth, and the leaves blighted in the middle of summer.

A great

A great part of Sandy warren has been planted with various species of the fir tribe, by Sir. P. Monnoux, and F. Pym, Esq. as also a part of Milbrook warren, by the Earl of Upper Ossory; and it is perhaps the best application that can be made of those hilly sands, which produce nothing except ling, in their natural state.

SECT. III.—FURZE.

SOME of the sandy hills which admit of little improvement, have been applied to the growth of furze or whins in various places, and the produce is used by bakers, lime-burners, &c.

They are generally cut every third year, at an expense of 1*s.* 6*d.* per hundred of faggots, and sold at 8*s.* per hundred; and the carriage generally costs the consumer 2*s.* more.

If the ground is rocky near the surface, the produce is trivial, as the long roots cannot find a passage into the subsoil; but where no such obstruction is met with, it appears by a trial purposely made, that a square pole produces on the average about sixteen faggots, each of which weighs 18*lb.* when first cut in the winter. The produce per acre will be therefore 700 (six score each) per annum, which being sold at 56*s.* will leave a gain to the amount of 45*s.* 6*d.* per acre, when the expenses of cutting are deducted. A furze ground forms, however, a retreat for rabbits and all kinds of vermin, and consequently another deduction from the profits must be made on this account.

CHAP. XI.

WASTES.

THE chalky downs that meet the eye of every traveller who enters the county at Luton, or Dunstable, have been estimated at 4000 acres; but in addition to this bleak and barren track, the waste lands of Bedfordshire occupy a very small portion of its surface.

In the improvement of the downs it does not appear that much can be effected, as in many parts they are nothing but a mass of hard chalk, called hurlock, or clunch, which possess a slight covering of loamy soil, barely sufficient to support a scanty crop of indifferent herbage.

The northern acclivities of the Chiltern-hills are, in many places, more steep than any other hills in the county. Totally inaccessible to the plough, such parts must remain nearly in a state of nature; and their annual value is supposed not to exceed 2s. or 3s. per acre.

There are some parts, however, that are capable of growing sainfoin, &c. and might be improved in other respects by enclosure.

In the sandy district, the parishes of Clophill, Flitton, Steppinly, and Heath and Reach, with Leighton, contain a quantity of hilly common ground, the principal product of which is heath or ling.

Leighton-heath, which is probably the largest, is said to contain 400 acres.

The

The improvement of some of these heaths would, if enclosed, proceed very slowly, from the distance of clay, and the want of long leases.

In some places, where the enclosure is of several years' standing, a portion of the soil still retains the dreary aspect of a warren.

Such as know the value of the white and grey sands, the soil where nothing but ling delights to grow, will never envy the farmer who occupies them only from year to year. Even the opulent proprietor sometimes hesitates

“ To brighten ploughshares in the burning soil.”

Few of the unenclosed towns in the rest of the county contain any considerable extent of commons, except the roads, and the Lammas or half-year ground. At Yielding there is, however, a common of 80 acres; at Sharnbrook, 50 acres; and at Cranfield, 40. In addition to these, may be mentioned the low wet common at Billington, and a considerable one at Biggleswade, which would appear to be of some value, as the right of keeping sheep on it is made a subject of legal decision.

CHAP. XII.

IMPROVEMENTS.

SECT. I.—DRAINING.

MUCH of the ochreous peat of the sandy district has received a complete drainage, as may be seen in the parishes of Maulden, Crawley, and Flitwick. In some places, as at Crawley, large and deep open-drains, in conjunction with covered ones, have been successfully employed.

At Prisley-moor, in the parish of Flitwick, it is generally understood, that Mr. Elkington's mode of drainage was tried with very partial success. Some have, however, asserted, that his directions were not strictly followed; and others, that his method was incompetent to effect the intended purpose. If the peat lie very deep (as it often does) on a porous soil, it is evident that the principal spring may be situated in the very lowest part of the vale; in which case, an external drain, carried (according to the plan of Mr. Elkington and Dr. Anderson) between the hill and the bog, may probably fail of producing the desired effect. The drains which effectually cured the moor at Flitwick, were sunk to a great depth, an expedient very naturally suggested by the ill success of such as were more superficial.

Several failures in drainage have happened in consequence of the water rising directly upwards in a particular

ticular spot, after passing under some solid stratum, which was not broken through by the drain or the augur. In the draining of deep mosses of peat, their extreme dryness after that operation has been performed, sometimes makes the want of water almost as great an evil as its former abundance. The materials used in this important business consist of tiles, bricks, sandstones, pebbles, wood, and straw.

The larger drains, where the flow of water is considerable, have been sometimes constructed in a square form with sandstones; but in the drainage performed by the Duke of Bedford, much use has been made of draining-tiles, which are much like common ridge-tiles, but are thicker and stronger, with a narrower and deeper cavity. The tiles are supported on two rows of common bricks, a horizontal view of which may be seen in the following figure:



The foregoing remarks relate chiefly to the reclaiming of bogs, which, beyond the bounds of the sandy district, are almost unknown.

In the gravels, the operation of draining is commonly an easy and unexpensive business; as one or two good drains, properly managed, will often lay dry a considerable extent of ground.

The practice of furrow-draining on the wet clays has, within a few years, made much progress in this county. The Rev. H. Smithies, of Little Staughton, drains the furrows of his tithe allotment by parting them with a plough, and afterwards digging with a narrow

narrow tool 14 inches deep. These drains are then filled with straw only, and the land is made level by repeated ploughings, to render it capable of being drilled and hoed in the Suffolk manner. By this practice the mould lies very deep over the ancient furrows, and would, unless previously drained, be peculiarly retentive of water, though it is now very dry and firm soon after showers have fallen.

The whole process cannot be better explained than in the communication with which I was favoured by Mr. Foster, of Bedford, who pursues nearly the same practice as Mr. Smithies.

“ Bush-draining, as well by deep cross drains as by shallow drains up every furrow, has become pretty general in some parishes, particularly Little Staughton, and Riseley. The furrow-drains are made by first ploughing them out, as deep as possible, then digging them with the narrow draining tool one good spit deep, and after scooping the bottom clean, putting in black thorn bushes covered with straw, though some content themselves with straw only. Provided the mouths are carefully kept open, and the receiving ditch is four or six inches deeper than the drain mouths, and provided they are not injured by carting or other violence, they will last a very long time.

“ A bush drain a yard deep in clay, costs in labour 2s. 6d. for 22 yards in length: furrow drains of one spit deep cost 2s. 6d. to 3s. 6d. for 110 yards.

The average expense of draining under each furrow, which chiefly depends on the breadth of the lands, and consequent number of drains, may be about 3*l.* per acre, inclusive of bushes.

“ The benefit is almost incalculable in every respect. Land which before used to bake and crust at the surface,

face, in case of heavy rains succeeding its being worked fine, by which many crops have been lost, is gradually cured of this defect, by becoming more porous. The furrows, in which before, the crop was weakened or destroyed to the breadth of four or five feet, now even exceed the ridges in produce.

“ Where before, the general wetness rendered the ground unfit for any tool to work, or the drought made it too hard to be impressed, now the land can be worked in almost any kind of weather, and turnips entrusted on strong soils.

“ Of all newly discovered tools, none has been near so useful to our clays as the drain or mole-plough, which is now in frequent use in some parishes in the north of the county. No soil can be so well adapted, or so much require, the use of this simple but excellent instrument, as our clays; which, while they are strong and close enough to keep the holes open for any length of time, contain no stones or other impediments to its progress, and have almost every where fall enough to carry off the water.

Eight horses (more are not wanted) will drain from five to seven acres in a forenoon; and the duration is such, that some fields which were done six years ago, are yet more completely dry than immediately after the operation. Though before of a wet and cold nature, now the furrows are even sounder than the ridges, and the heaviest stock can tread them in the wettest part of winter without the least injury. “ Some may have tried the plough-drain without success; but either their soil must have been unsuitable, or there was not a continued fall for the water: an improper time was chosen, or some mistake was made in the operation.

“ Upon clays like ours I could ensure success, if the following

following points are attended to: much fall is not wanted, but it must be a continued fall; and if there is a dead flat, or the least rise in any part, particularly near the mouth of the drains, let the gutter to receive them be cut above such flat or rise.

“ Before the operation is begun, let the receiver be cut in a proper situation, and at least four inches deeper than the drain-mouths, care being taken that no water may stand in any part of it.

“ When the plough is put into the gutter, previous to its setting off let a sod be taken from the other side of the bank, if needful, to prevent the back part of the beam from being lifted up.

“ When the horses set off, let a man weigh heavily upon the plough for several yards, to keep it down to its full depth. If these two points are not attended to, it is most likely the drain will be less deep at the mouth than at the distance of some yards from it; and the consequence will be, that a sediment will in time collect in the hollow, and stop the water. To prevent this, I always work it up hill only, never letting the horses cross the gutter, where they otherwise will tread in the mouths of the drain. I greatly prefer this mode to that adopted by some, of making the gutter after the drains. The attendant man should proceed with a spade before the plough, in order to cut away any obstacle, such as an ant-hill, or whatever else might raise the plough out of its proper depth. If it is thrown out by a root, stone, or other obstacle, the place should be marked, and a bush-drain laid in it of the same depth.

“ It is most material not to perform the plough-draining in very wet weather. The horses would then do great injury by trampling the surface; the too loose

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wasly earth would run in, and fill up the holes ; and, still more, the tread of heavy cattle would crush in the drains, before the ground had time to derive that consistency from their operation, which will afterwards enable it to resist the foot of the heaviest beast.

“ The most danger in this and every other way, is near and at the mouths of the drains, upon a careful attention to which, the duration of the work will chiefly depend. In autumn, the lower earth is generally too dry for plough-draining ; in winter too wet ; but the time to ensure success is, when the surface becomes firm, about the end of March and through April.

“ Plough-draining has generally been only used in grass land ; but from repeated trials I can assert, that it is also applicable to arable, and answers there so well, as, in clays, to render the great expense of furrow-draining with bushes almost needless. The time to do it is, when the land is in clover, preparatory for wheat ; then let it be plough-drained into a bush-drain between the land-ends and the headland, dug about four or six inches deeper than the holes. When ploughed for wheat, let it be *cast*, so as to cover the drains. Then if it lie flat, or even hollow, in the wheat-ridges, it will nevertheless remain in a safe and sound state, however wet the winter may be, and the wheat will escape yellowness, and other injuries proceeding from exuberance of winter and spring moisture. Nor will the advantage end here ; but the drains will continue to take full effect till the next fallow, perhaps in some degree even till the next clover-ley, when the operation will be repeated.”

Mr. Brown, at the new farm at Dunton, has drained much of his farm with a mole-plough, in nearly the manner above described ; and he thinks the effect, if ploughed

ploughed 18 inches deep, will generally last about six years. I found several fields in this farm without any headland at the lower end of the lands. In draining these fields, the mole-plough was drawn as near the end as a team of ten or twelve horses double would permit, and a bush-drain laid for a few poles, to connect each furrow-drain with the ditch near the fence or brook. The soil of this farm is a tenacious clay; yet Mr. Brown assured me, that the puddles of water formed by a heavy shower, always disappear in a few hours after the shower has ceased. Furrow-draining has found many advocates in the east of this county, though the great expense of the operation, and the mutual jealousies of landlord and tenant, it is easy to observe, will cause it to proceed with a slow pace.

At Gravenhurst a farmer informed me, that he had drained four or five acres in the open field; but as an enclosure was in agitation, he apprehended he should lose the ground before he received any benefit. At Arlsey, I observed Mr. Davis and another farmer engaged in this business, and various other instances might be mentioned in the parishes of Henlow, Clifton, Holwell, Shidlington, Stondon, Southill, Warden, Northill, Hawnes, &c. In the latter parish, Lord Carteret has drained the whole of the farm which his Lordship occupies, the soil of which is a strong cold clay, which, it is said, will hold water like a dish. The benefit of the operation is here great and indisputable; though I am informed by his Lordship's bailiff, that after heavy rains, some puddles of water occasionally remain for several days, which make it impracticable to lay the land quite flat.

Common *ringe* or range wood, was here used, which was covered with ling instead of straw; blackthorn-

bushes are, however, generally preferred, where they can be obtained, as they are thought more durable than any other for this purpose. At Marston, much draining has been performed on a farm of Mr. Foster's, who pays the whole of the workmanship, and the price of all the bushes, except what could be obtained from the farm, and the tenant is to allow interest for the money thus sunk by the landlord.

In the draining of pasture, I find it recommended by several, and practised by Mr. Foster, to open a furrow with a common plough previous to the use of the mole-plough. The furrow is afterwards returned to its place, to prevent the sun from cracking the ground.

In the improvement of land it should be considered, that a tenant's duty can never extend beyond his interest; an assurance that he shall enjoy the fruits of his labour is therefore indispensable in all cases, and whenever this practice shall become systematic and general, improvements will proceed as rapidly in the last years of a lease as in the first. Small farmers are deemed incapable of improving the land, because their capital is insufficient; but in these cases, the landlord may advance the money which is required, at proper interest, &c. If, indeed, the proprietor should feel that he cannot conveniently spare money to improve his own estate, he will be convinced, at least, that there are large farmers in the same situation, and may therefore be led to pity the misfortune of the small farmer, rather than increase it tenfold, by giving his farm to such as possess a sufficiency.

SECT. II.—PARING AND BURNING.

In the original Report it is said, “This species of management is very little practised in this county. I observed, that the land pared and burnt in the present spring is sowed with barley—the worst of all possible management.”

The practice of paring and burning is not at present pursued to any great extent. On the first breaking up of peaty soils, it is in common use, and no doubts have arisen of its present and ultimate utility. Neither the farmers nor proprietors are under any apprehension of destroying a soil of six feet deep.

Several rough sedgy pastures are to be found in various parts of the county, of almost as little value as a sandy heath covered with ling, which, though answering no other end but that of starving the occupiers, are not permitted to be ploughed. Yet wherever permission is given to break up these deserts, they are commonly pared and burned, and sowed with coleseed at one ploughing; and the increase of this practice in the north and east of the county, is a favourable indication of the progress of improvement. The old tale of the exhausting effects of the fire has, however, some advocates among all descriptions of people, and proves (if it proves any thing) that there is truth on both sides of the question.

At Pertenhall I was informed, that some paring and burning had been practised, which was followed by three or four white-straw crops; and that an opinion prevailed, that it was “*good for the father, but bad for the son.*” The same proverbial adage (as appears

by Dr. Plott's Natural History of Oxfordshire) was formerly applied to the use of chalk as a manure.

At Felmersham, a small farmer was most decidedly hostile to this practice: nothing (he affirmed) was so pernicious to land as paring and burning. A field somewhere in his knowledge, and another at Souldrop, was called the burnt ground, which was poorer than the others, in despite of all the powers of plentiful manuring.

If manuring was delayed too long, he thought nothing would recover it; and farther expressed an opinion, that the best way to break up old grass land is, to pare it thin with a plough, and afterwards follow in the same track with another plough, to cover the grass with mould.

In No. 252 of the *Annals*, p. 310, Mr. Young has recorded the practice of Mr. Pickford: "At Caddington, near Luton, where 5000 acres were enclosed two years ago, Mr. Pickford, of Market-street, hired part of the common of 800 acres, at 12s. per acre, and he pares and burns all, at the expense of two guineas per acre." Yet I found this gentleman (in 1807) had become a most decided enemy to the practice, from the experience that his fields, which were lined only, were far superior to those which were pared and burnt.

Such is the *contra* side of this celebrated question, in defence of which opinion much ink has been shed, and laws of prohibition have been enacted.

On the other hand, a farmer near Biggleswade being questioned as to the durability of the good effects of burning, gave nearly the following answer: "We are certain that burning the rough sward of cold clays, will cause them to produce three or four good crops of almost any kind of corn, and the land being new and free

free from couch, seems to need no fallow till after that period."

Mr. Fletcher, of Marston, burned fifty acres at Tickford-park, in Buckinghamshire, yet received 200*l.* for the two last years of his lease, which he assigned as one practical reason that the land was not injured by that process.

He has also burned twenty acres of rough sward at Marston, and had very good crops for four or five years, almost without manure, which produce he is assured is more than double of what could have been obtained by ploughing only.

In respect of exhausting the land, Mr. Fletcher observes, that one half of the manure which might be made from the exuberant crops of the first four years, would amply repay all the exhaustion, and even make the land like a hot-bed.

Land which is fairly worth 25*s.* per acre, Mr. Fletcher agrees should not be disturbed, but if worth no more than 1*l.* according to general estimation, it seldom produces the occupier any thing, and should be burned and ploughed for the public good.

In the determination of this interesting question, as in most others, direct experiments are wanting, and many appear not to consider that the whole effect is deducible from the combined action of distinct principles. Some of the effects of fire are well known. "Paring and burning," says Lord Duudonald, "is a dissipating process, whereby nineteen parts out of twenty of the vegetable matter, the only substance the fire can act upon, is thrown into the air." Now, granting the correctness of this statement, is it not more than probable that much of the matter thus dissipated is, in still weather, returned to the soil in the nightly dews,

though a part of it is doubtless lost to the soil which produced it?

“The saline matter,” adds the Noble Author, “produced in the process of paring and burning, for the most part, consists of vitriolated tartar, which like Epsom, and Glauber’s salts, have very powerful effects in promoting vegetation.”

These salts have been supposed by some to act merely as stimulants, causing in vegetables a kind of hunger, and inducing them to seize every nutritious particle within their reach, which their natural juices would not have enabled them to digest.

This theory is, like many others, unsatisfactory, rather on account of its deficiency, than of any positive error in principle. The power of these salts is supposed with great plausibility to be of three kinds, viz. dissolvent, attractive, and stimulant. They dissolve the nutritious particles of the soil, by which means a power is given of exhausting it by successive crops, without rest or manure. They attract moisture from the atmosphere, which partly liquefies, and thus enables them to enter into a combination, not only with the impurities of the air as carbonic acid, but with the air itself forming nitre, &c.; and lastly, they stimulate the languid powers of vegetation into action, and give an artificial warmth, without which the products of the earth would often starve in the midst of plenty. It is generally said in this county, that the turf should be only *charred*, and not reduced to red ashes, if it can be avoided.

If the roots of couch be burned while rather in a damp state, and with a smothering fire, they become a kind of charcoal, and retain something of their shape and weight; but if consumed in small heaps, and in a perfectly

perfectly dry state, the ashes are extremely light and trivial, and apparently cannot exceed half the weight of the former kind.

There appears, therefore, a sufficient inducement to prevent as much as possible the loss of vegetable matter in the act of combustion, as also a reasonable expectation, that much of this necessary loss will be re-supplied both to the soil and the growing crop, from the depositions and dissolutions of air and water.

It has been repeatedly urged, that burning lessens and destroys the soil; an assertion which in the strict sense is absolutely unfounded.

If the objectors, by the term *soil*, mean only the roots of vegetables, they are doubtless destroyed, and their loss repaired in the manner above described. But the soil itself consists of the primitive earths, as clay, sand, and limestone, in all their various shapes and mixtures, with small quantities of iron, magnesia, &c. all of which resist the strongest fires; and the farmer need not fear to lose the smallest portion of them by the power of that element.

Clay, when hardened by fire, is no longer soluble in water or acids. If mixed with the soil after burning, it has a very considerable effect in loosening its texture, and promoting its fertility.

But in cold sour clays, where the grass roots have not sufficiently subdued the stubborn nature of the soil, and where care has not been taken to pare very thin, the product of fire consists rather of masses of brick than ashes. From this source, therefore, little benefit will be derived.

It does not appear that pure sand suffers any perceptible alteration by the action of fire. Yet to pare and burn a light sandy soil, is to reduce the clay, which

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is its cementing principle, to a kind of brick-dust, thus increasing the lightness and porosity of these soils, which are the worst, or indeed the only bad qualities which they possess.

A few acres of what was formerly a common in the parish of Ridgmount, the soil a loamy clay, were pared and burned some years ago. The tenacity of the soil was so far destroyed by the operation, that in a few hours after some heavy rains had fallen, the burned soil appeared scarcely wetted by the shower which had reduced the adjoining soil to a mire.

Paring and burning is charged with destroying the accumulated virtues of the soil; its destructive power is however very beneficially exerted on the obstacles and enemies of vegetation.

The rough sedgey surface of coarse sward, if not destroyed by fire on the first breaking it up, has an effect highly inimical to the growth of corn, and the produce of the first two or three years will thus afford a lamentable contrast with the luxuriant crops of burned soils.

The putrefaction of ling is so little promoted by ploughing it into the soil, that it is much recommended to be used in furrow drains, &c. which shews the propriety of either burning, or carrying it away on the breaking up of soils where it grows.

A great number of weeds are destroyed by fire, together with their numerous seeds, which, scattered on the surface of the soil, lie in ambush as it were, to cut off the supplies intended to nourish the corn or grasses. If the land is to be again laid to pasture, the various species of sedge may be deemed the very worst of weeds, and which are continually rising in patches in some soils broken up without burning. Such as are called

called sour clays frequently contain alum and other saline products of the vitriolic acid, which by their quantity (if not in quality) are injurious to the growth of corn. It is at least very probable, that what are called sour grasses, are nourished, if not generated by the acidity of the soil; at any rate, the fire will dissipate these sour juices as far as its influence extends.

Beeston leys was a considerable common in the parish of Northill, of which I received the following character from a farmer in that neighbourhood: "Beeston *leyses* was before the enclosure of as little value as can well be imagined: it produced a sharp sword-grass, that would have starved a rabbit. The soil is a very poor, cold, wet, light woodland, beneath which is often a blue golt clay. Much of it has been furrow-drained by digging with a spade previous to the draining tool, and afterwards pared and burned for coleseed. Some tolerable crops of oats have been obtained, but mostly bad; and the wheat seems very liable to mildew."—I saw a part of this ill-omened spot (November 14) which had been sown with coleseed after having been burned. The crop appeared very indifferent, except in the places of the fire-heaps, in which the coleseed was about half a yard high.

If the presence of an acid should be proved to be the principal defect of such soils, it is easy to account for the good effects of fire on the subsoil where the fires are made. New lime would also destroy the acid principle.

SECT. III.—IRRIGATION.

THIS mode of improvement was introduced into the county by the late Duke of Bedford, and various instances may be seen in the parishes of Woburn, Crawley, Ridgmount, Flitwick, and Maulden. Mr. Young has given such detailed accounts of these improvements in the *Annals of Agriculture*, that after inserting the principal passages in this Survey, but little more is to be obtained or desired on the subject of irrigation.

“ The country about Woburn is not calculated for any exertions in regular summer watering.

“ There is not a single permanent brook on the Duke's farm ; but the gentle declivities being extensive, they collect in rainy seasons much water in a vale, which winds to a considerable extent. In order to apply every drop that falls to all the use that is possible, he has converted a pond of thirteen acres into a reservoir for this purpose, and made others with the same intent, and, having ascertained the proper levels, he began with throwing down hedges, filling ditches and swamps, levelling inequalities, and converting some arable to grass, so that 100 acres might be formed into one piece. This is nearly finished, and I viewed it in full float. In 1795 he watered 20 acres ; in 1796, 40 more ; and in 1797, 20 more completed this most useful work. When I saw it (February, 1798), it was all under water, and so well executed that none was stagnant.

“ A floater who understands the business perfectly, is constantly employed when there is water, and having several men under him for new work, as great additions are making, he directs the whole.

“ The

“ The irrigation begins with the first rains that fall in autumn ; if the quantity is small, it is given to the parts that want it most ; if much, to the whole.

“ The Temple reservoir, or Draklow pond, can be let down two feet, which over thirteen acres of land, is a considerable quantity, always in reserve for moments when most wanted.

“ The ridge and furrow parts of the meadow are irrigated by conducting the water by the carriers on the crowns of the ridges, and the furrows act as drains to convey it away : this is found to be the best way of irrigating where there is plenty of water, but it demands a larger quantity than flatter work. If a season is very wet, so as to admit working the water at pleasure, the meadow is floated and kept dry alternately ; floated for ten days or a fortnight, and then dry for a similar period. This hundred aced mead is in one piece, and close to the park : it was, therefore, an object to lay it out in the neatest manner, and to vary the lines of the trenches in such a way as to conceal them from the eye. This is so well done, that many strangers pass the adjoining road without knowing that there is an acre watered. Such attention to beauty has made the irrigation here expensive ; it may have amounted to 8*l.* or 9*l.* per acre. But in the improvements which are going on upon the worthless boggy bottom lower down, the carriers are traced along the higher parts without levelling, and nothing is done that is not necessary for equally conducting the water. This will be as profitably watered as the other, and the expense will not exceed 4*l.* or 5*l.* per acre.

“ The soil of the hundred acres is in general a good sandy loam, and was worth to a farmer about 25*s.* per acre : its present value may be estimated from the produce ;

duce; upon an average, 50 acres of it may be spring-fed with sheep to the value of 20*s.* an acre. This is 10*s.* an acre over the whole.

“ Last year the whole produced from two to two tons and a half of hay per acre: but, for an average, the Duke expects 35 cwt. at least. Last autumn the after-grass was so large, that if it had been mown, the produce of hay would have been 25 cwt. nor could it be valued for feeding at less than 30*s.* But let us call the after-grass 20*s.* and the spring-feed 10*s.* and the 35 cwt. of hay, at 2*s.* 6*d.* or 4*l.* 7*s.* 6*d.* it makes in all 5*l.* 17*s.* 6*d.*, the fair rent of which is 2*l.* 18*s.* 9*d.*; deducting the old value of 1*l.* 5*s.* there remains 1*l.* 13*s.* 9*d.* from which take 5*s.* an acre, as the expense of watering, and the profit per acre in rent is 1*l.* 8*s.* 9*d.*, or upon 100 acres 143*l.* 15*s.*, which, at 28 years purchase, is 4025*l.* from which deduct the original expense of 900*l.* and there remains of net profit on the undertaking 3125*l.* So decidedly advantageous to the proprietor are such great, and to the public also such useful works, even under the circumstance, manifestly unfavourable, of not having a drop of perennially flowing water, and using that which falls from the sky alone. How many thousand acres are there in every county of the kingdom, open to the same improvement, but remaining in a state of utter neglect. Sheep have been in this mead from autumn, and not one rotten.

“ The adjoining tract of low ground which the Duke is at work upon at present, is of little or no value, being a boggy bottom, much of it producing little besides rushes and other weeds; of such land he has a large tract of about 200 acres joining Crawley bog.”
—*Annals*, vol. xxxix. page 387.

A part of the bog above mentioned, is now in the
possession,

possession of Mr Runciman, who has formed a considerable part of it into water-meadow.

This gentleman has caused some of it to be thrown into ridges with the spade, at an expense of fifteen or sixteen guineas per acre; in other places the turf was pared off, and turned aside, to permit the land to be ridged up two or three times with a plough, after which process the turf was relayed on the surface. Some parts remain however nearly flat, or slightly raised, which, though an acknowledged defect, is expected to be gradually remedied by the scourings of the carriers and drains being constantly spread near the centre of the ridges.

On the Duke of Bedford's farm at Maulden, are 26 acres of water-meadow, of which Mr. Young speaks as follows: "The exertions on this farm by irrigation are very great indeed, and the success adequate. In 1800, a field spring-fed for six weeks from March 4th, kept five ewes and their lambs per acre, which at 8*d.* per week, is 3*s.* 4*d.* or 20*s.* per acre. And from this farm, so lately a desert, the Duke has sold shearling South Down at three guineas; and a large lot for 50*s.* 1100 sheep and lambs were kept on this farm in summer, and near 1000 wintered."—*Annals*, No. 250, page 135.

The rent of this farm is 473*l.*

A considerable part of this water-meadow is rather flat, and is much inferior to the rest: it will be raised by degrees, by a proper distribution of the scourings of the ditches. The soil of the meadow is peaty, of various depths; but in some places the peat is thin, and on a clay substratum; but very little of it was of any considerable value before it was irrigated. The grass appeared to be about four inches in length on

February

February 23, in the present year (1807), and nearly two tons of hay per acre is expected after sheep-feeding in the spring.

Mr. French, His Grace's bailiff at Maulden, formed five or six acres into water-meadow last year, in addition to the above, and mostly by the use of the plough. The land was ridged up several times in the proper directions; the ridges vary in width from eight to twelve yards, and in some of them, where it was not convenient to lay out the ridges in what is said to be a proper fall, the land is laid on various levels, with sudden descents in the nature of lock, by which means a regular overflow takes place in all parts.

The land was sowed with oats last year (1806): they succeeded tolerably well toward the ridges, or high parts of the ground, but the furrows bore very little; nor will they produce grass till some of their sulphureous impregnation is washed away by the water.

The expense of this improvement could not amount to many pounds per acre.

The adjoining flat peaty meadows (which were irrigated without raising them into ridges, before the subject was well understood in this county) are of very little value. It is ascertained that stagnant water is pernicious on such soils, and of little benefit on any, as it will destroy the best grasses, while the sedgy aquatics and rushes will flourish more vigorously.

The late Duke of Bedford procured the insertion of a clause in the Acts of Enclosure for Maulden, Ridgmount, and Crawley, by which a liberty was given to make use of the various brooks for the purposes of irrigation, by turning their course through old enclosures, &c. as might appear most convenient, making due satisfaction to the parties injured.

In

In consequence of this clause, some attempts were made in the irrigation of some low, flat, clay meadows in Ridgmount, which have been since abandoned; and there appears sufficient reason to believe, that cold clays, irrigated in their natural state, and which cannot be quickly laid dry, are injured by the water rather than improved.

Mr. Cowley's watered-meadow of twelve acres three roods and six perches, in the parish of Aspley, was constructed at the expense 3*l.* 10*s.* per acre; for which a premium of 25 guineas was presented to him by the Duke of Bedford.

The method pursued in the construction of this irrigation, consisted in making the best use of the small natural declivities, without raising it into ridges. The ridged plan is however acknowledged by Mr. Cowley to be far the best, but in a county where the landlords have pretty generally agreed to give very few except short leases, tenants will not be expected to expend fifteen or sixteen guineas per acre, where not the law of the land, but the *law of honour*, is their sole security for a remuneration. Mr. Cowley uses the water only in winter and spring, and supposes the gutters have as beneficial an effect by draining the land, as by enabling him to turn the water over its surface.

The water-meadows at Prisley-farm, in Flitwick, are in three divisions, of nine, six, and five acres. The largest meadow was begun by the late Duke of Bedford, and the whole has been finished under the direction of his noble successor.

An account of the improvements on Prisley-bog has been published in the Communications to the Board of Agriculture for 1805; and also by Mr. Smith, who conducted the undertaking, in the *Trans. Soc. Arts*,

vol. xxiii. ; but as there is much reason to believe that few of the farmers of this county have read either one or the other, it may be proper to insert a few of the most material observations.

“The whole surface of the boggy ground was pared with a breast-plough, and the peaty matter thrown together in ridges like common high ploughed land, with a ridge like a head-ridge, at one end of each set of ridges. Each ridge had a cut or channel for the water on the top, and a drain in the furrow or hollow between it and the next ridge. The head-ridge had a large channel for water on its top, which supplied all the other ridges with water, and the main ridge was itself supplied by its connexion with a large channel or feeder, which first conveyed the water out of the common brook into the meadow.

“The furrow between each head-ridge, and the end of the upper beds, had a large drain, into which all the channels of the drains in the upper furrows discharged their water ; which was by this main drain carried back to the brook again at a lower level.”

To raise the water high enough to run into the upper water-course, a dam was placed in the brook to pen up the water till it rose near the surface, and the water is carried over the brooks or large drains in some places, in a broad shallow trough, the planks across the bottom of which are, in the carpenter's phrase, *tongued* together. The ridges are eleven yards wide, the crowns of which are one yard above the furrow, which gives the water a very quick motion, that might perhaps be moderated to advantage, in cases where the supply of water is not very plentiful. An account of the produce of the nine-acred meadow, was given to Mr. Smith by order of the late Duke of Bedford ; by which

it

it appears, that from March 29, 1803, to June 21, 1804, this meadow produced above seven tons of hay ; fed twelve score sheep for three weeks ; four score fat sheep for three weeks more ; and eight score and four lamb hogs for nine weeks ; though it was not managed in the best method it might have been. The value of this produce may perhaps be calculated as follows :

7 tons of hay, at 2s. per cwt.	£. 14	0	0
210 sheep, three weeks, at 8d. per week each, ..	24	0	0
80 fatting sheep, three weeks, at 8d. per } week,	8	0	0
164 lamb hogs, nine weeks, at 4d. per head, ..	24	12	0
Total,	70	12	0
Or per acre, about	£. 7	17	0

The charges of management are not mentioned ; but there are some good reasons to believe they are by no means trivial.

The watered-meadows, particularly the two last, were almost entirely naked black peat, without any herbage when first formed ; and the ochry and thick water which was turned over them had a most rapid and surprising effect in producing the *poas*, *alopecurus*, *festucas*, and others of the best grasses which were not before to be found on the bog. Last year I observed, however, that the leys were sprinkled with rushes and sedge. The best grass is near the ridges, and Mr. Carr, the bailiff, observed, that the deposit of the water would naturally improve the ridges first, but was perceptibly approaching toward the furrows, and would soon make them nearly as valuable as the higher ground, which is not the case at present. It

has been thought remarkable, that a benefit should result from the use of ochry and sulphureous waters; but there seems little doubt that the impregnation of these waters is so slight, as to enable them to wash out and carry away the vitriolic salts, which are accumulated in such abundance in the lower strata of peat, that no vegetable will thrive till much of them is removed. Vitriol of iron has been termed a vegetable poison, with much the same degree of propriety as brandy, &c. has been called an animal poison, liquid fire, &c. Here is a large field for chemico-agricultural experiments, which will be cultivated, whenever those who are most able to encourage experiments of this kind, shall become sufficiently convinced of their great utility.

Irrigation has been attempted on a small scale in several places, which deserve no particular mention. Part of a sandy pasture has been irrigated in Liddington, but the water was insufficient to effect any important amelioration.

It is however very evident, that watering will destroy the moss of dry pastures, and promote the growth of the white honeysuckle.

The intermixture of property, and the opposing interests of various parties, are considerable checks to the progress of irrigation; but perhaps the refusal of leases, or other securities to the tenants, is of equal weight in the negative scale.

Connected with this subject is that of embankments, of which there are none in this county, except those which confine the mill-streams on the rivers, &c. The river-meadows on the Ouse are perhaps 40 poles wide on the average, which, as the circuitous course of the river extends through the space of about 50 miles, amount

amount to perhaps 4000 acres. These meadows are left in many places at about 40*s.* per acre ; and perhaps about half the quantity receive the benefit of winter irrigation, and perhaps equal injury at other seasons, by the sudden swells of the river after heavy rains.

The farmers who occupy these meadows, seem to have more dread of the inundations of the river, than hope of the benefit resulting from watering ; amongst others, Mr. Bithrey, of Stoke-mill, Bletsoe, thinks the grass produced by water is rather unsubstantial, and defective in the nutritive principle. There is, indeed, no doubt entertained of the inferior quality of the grass of water-meadows, a defect which its early appearance and abundant quantity, amply compensates.

There are a considerable number of mills on the Ouse and Ivel, and other smaller streams, which have been proposed to be taken away, without a good explanation of what is to be substituted in their place. The river-meadows might doubtless be improved by irrigation ; but embankments are equally necessary, to prevent the injurious effects of inundations.

The benefit of irrigation is great and unquestionable ; yet the expenses attending it are such, as ought to excite a degree of caution.

The expenses of the attempts of Mr. Elkington to drain Prisleigh-bog were very great ; and the subsequent expenses of irrigation are, as I am informed by His Grace's agent, 1200*l.*

SECT. IV.—MANURING.

MARL.—Marl, or clay, is in common use on the light sandy soils ; but very little, if at all, on the gravels. The quantity which is usually laid on an acre, is 60 cart-loads of a cubic yard each ; but it varies from 40 to 80.

The greatest exertions in this, and indeed every other mode of improvement, were made by the late much-lamented Duke of Bedford, on the wild heaths of Crawley, Ridgmount, Mauken, and Prisley-farm, at Flitwick. These sands have been marled to the amount of from 60 to 80 loads per acre, in the first instance, with a repetition of about 50 loads after a few years' interval. Considerable improvements in this line have been made by most of the occupiers of sandy soils ; but as leases (or in other words, securities, that a tenant, by improving his landlord's property, shall not injure his own) are not in fashion, it need scarcely be added, that expensive improvements proceed mostly with a calm and sober pace.

Marl is not found in all situations ; and I believe few instances occur of its being drawn much more than half a mile.

At Potton, one side of the town is clay, and the other side is sand ; but marling the sandy land is very little practised in this parish. The distance of the clay, they assert, is too great to render the carriage of it consistent with profit.

I believe there is little, if any, clay to be found on the warren between Sandy and Potton.

The hilly parts of the sandy district present many difficulties to this mode of improvement, which need
not

not be enumerated. Its durability, in such situations, is also rather precarious, as it is liable to be washed away, and carried to the vales, by every heavy shower.

In Liddington-park, some hills have been marled by Mr. Platt, where a cart can scarcely be trusted with safety. Other hills of a similar nature have, in various places, been sown with furze or broom, which is used for burning bricks or lime, or for domestic uses; and it is doubtful whether the latter mode is not the most profitable.

“His Grace the Duke of Bedford began to marl Speedwell farm in 1796: it is a dark blueish marl, with white chalk-stones; effervesces much in vinegar. Spreads 65 loads an acre; filling and spreading, about 3d. a load: five oxen and three horses have this winter done half an acre a day. This part of the expense must amount to about 18s. 6d. viz. 2s. 6d. a horse, three carts included; oxen 1s. 6d., and driving 3s. 6d., for 32 loads.”—*A. Y.*

An acre, in this way of calculating, would cost in carriage 37s., and in filling and spreading 16s. 3d.; but since 1796, 4d., and even 4½d. has been given per yard or load, which would amount to 21s. 8d. and the whole expense would scarcely fall short of 3l. per acre.

Chalk and Lime.—Chalk is used by several farmers at Studham, Whipsnade, &c. Pits are sunk of various depths, in the middle of a piece of six or seven acres; and the chalk is drawn from them in buckets, in the same manner as in Hertfordshire.

With respect to the merits of chalk, it seems to be admitted, that it gives a mellowness and friability to strong soils, which proves advantageous to the growth

of most kinds of corn. Mr. Pickford, of Market-street, has been in the practice of chalking his land; but has left it off, from a conviction of the great superiority of lime. He believes that chalk is not a manure; and that the land that is chalked requires more manure, rather than less, in consequence of the chalk being laid on it.

The use of lime, or burned chalk, is very little known in Bedfordshire.

Mr. Pickering, of Harrold, has limestone, and a lime-kiln, on his farm. He has used 160 bushels per acre for turnips, with some success; but the benefit of lime is little perceived in the first crops.

Mr. Golding, of Biddenham, has seen it laid on wheat without any sensible effect.

At Sharnbrook, and some other places in the limestone district, are to be seen some kilns, which have been used for preparing this kind of manure; but the high price of coals, induces even the advocates of lime to leave off the use of it, and probably adds weight to the prejudice against it which prevails in all the north of the county.

Passing from Winnington to Knotting, I saw some land that was limed in the parish of Rushden, in Northamptonshire. The farmer informed me, that liming was disapproved by his Bedfordshire neighbours, though commonly practised in Northamptonshire. The lime, in this instance, was burned at three miles distance, and sold at 3*s.* 3*d.* per quarter, which is less than half the usual price at Bedford.

At Kimbolton, I met with another advocate of lime in Mr. Smith, bailiff to the Duke of Manchester. Mr. Smith has seen a field of wheat, one part of which was folded, another part manured with cart-dung, and another

another division was limed: the two latter produced the best crop.

The proper quantity of lime per acre, this gentleman states at about 100 bushels, which, procured at some distance at 5s. per quarter, amounts to 62s. 6d. carriage excluded.

Prisley-farm, at Flitwick, is also in the occupation of His Grace the Duke of Manchester; and there, I understand, some lime has been used on breaking up a peat bog. The great utility of lime in such cases is unquestioned; but many will incline to the opinion, that it ought not, as I believe it did in this instance, supersede the use of paring and burning.

Lord St. John's bailiff, at Melshbourn, has limed some land, and got better wheat and fewer weeds by its use.

Mr. Bennet, of Tempsford, has seen one acre limed for experiment, without any apparent effect.

Mr. G. Aikin, late of Elstow, gives an opinion of lime in a letter to the Board of Agriculture:

"I have used lime, twelve quarters per acre, at 5s. 4d. per quarter, with great effect; but the present price (8s. per quarter) is too high to allow a continuation of it."

The advocates of lime above-mentioned, are natives of Northumberland, Worcestershire, Suffolk, &c.; their opinions are therefore imported, and not the growth of this county.

Since the Grand Junction Canal has been completed, lime has been sold at Fenny Stratford at from 3s. to 4s. per quarter. Mr. Grant, at Leighton, has tried lime on his sandy soil in Buckinghamshire, with incalculable success, and is pursuing his experiments on every different

different soil, and as a compost with other manures, which, so far as can be at present observed, promise great improvement.

At Milton Bryan, Sir Hugh Inglis has used lime as a compost with earth.

Before the enclosure of Lidlington, a farmer limed a single land of clay, and another of sand: the effect was said to be discernible on the latter for many years.

At Luton, no lime is used, as it is supposed to be a kind of land where lime is of little utility; but at Market-street, I find Mr. Pickford an advocate for the use of lime on every kind of soil. This enterprising cultivator has enlarged his lime-kiln. It is now, I believe, fourteen or fifteen feet wide, and nineteen feet deep; rather contracted at the top, and considerably so toward the bottom.

The lime is drawn from three sides of the kiln, and to the amount of three cart-loads per day.

Mr. Pickford has contrived to support the lime which is near the walls of the kiln, till some of it is drawn from the middle, without which expedient, he asserts, it will not readily slip down, but form lodgements at the sides.

The lime is supported by passing an iron-handed shovel into it, over a bar of iron at the top of the holes. Several holes are made in the handle of the shovel, which receive the point of a pin, the upper end of which pressing against the brick-work, keeps the shovel in its place.

The kiln is built in a chalk-pit of considerable depth, and the chalk is of a soft soapy quality, except the upper stratum, which is harder, and is rejected for a reason which I am unable to explain. The lime is carried

ried to the land hot from the kiln, which keeps in constant employ five or six men for three-fourths of the year.

More than 500 acres of Caddington common have been limed from this kiln within a few years, after the rate of 200 bushels per acre, which in the central parts of Bedfordshire, would have cost the farmer at least 5000*l*.

This gentleman also mixes lime with the rubbish picked off the lands, which, after turning two or three times, becomes a good manure.

On pasture land, Mr. Pickford has a high opinion of the virtues of lime, and has used it in considerable quantities on his farm at Market-street. He affirms, it does no injury to grass which is half fit for the scythe; it makes the herbage finer, sweeter, and more luxuriant, and white clover grows spontaneously where it is laid.

The utility of the various fossil manures is only known by practice, which, as has been often seen, does not speak a uniform language in different situations; scarcely a farmer is to be found who has attended to the chemical properties of soils, in consequence of which, it is easy to foresee that many will form erroneous general opinions from the local circumstances of their own farms. The principal utility of fossil manures appears to be rather mechanical than nutritive. If a soil be too loose or too hard, it will mostly be too dry or too wet, the disadvantages attending which are obvious, and may be corrected by the use of clay, lime, &c. without considering them in any sense as substitutes for yard-dung.

Clay is mixed with sand to increase its tenacity, but it ought to be known, that what is called clay or marl, is a natural mixture of all the fossil substances: viz.
alumine

alumine (or pure clay), silex (or the round small pieces of flint called sand), lime, combined with carbonic acid, or the acid of charcoal (commonly called chalk or limestone), and sometimes a small quantity of magnesia, which latter is a substance almost entirely unknown to farmers in general.

If pure clay, which is, however, not to be found in an uncombined state, be mixed with pure sand, its effect is to fill up the pores, retain a quantity of moisture, and to cause the particles to adhere or stick together. But if the clay which is used, contain half its weight of sand (as is frequently the case even when little is so coarse as to be perceptible to the eye), it is evident that a much greater quantity must be used to produce an equal effect with the pure clay.

Clay is always mixed with much sand, but such as is called marl, contains a small quantity of chalky substance, which makes it ferment with acids. To this also it seems to owe much of its friability, as the more chalk it contains, the more easily it crumbles to dust by the effects of frost, &c. of course when this kind of marl is laid on sandy soils, a great quantity of it does not make it hard and stubborn.

Chalk has been before described to consist of the chemical substance called lime; by burning it loses four-tenths of its weight. The composition of pure chalk has been found by modern chemists to be as follows:

Oxygen, or acid principle,	29 parts.
Carbon, or charcoal,	11
Lime,	60
	100

The friability of chalk and lime is in some degree
commu-

communicated to clay soils, by using them as manures, but they add to the tenacity of sands by filling up their pores, and mixing with them into a kind of mortar. The effect of lime is, however, said to be inferior to that of chalk, in both the mechanical intentions above-mentioned; but of this opinion some doubts may be entertained. At any rate, the practice of laying 100 bushels of lime per acre, and 1000 bushels of chalk, will not decide the question.

In improving tough clays by means of sand, the white kind should be preferred, as it is the least tenacious in its own nature, and appears in the greatest quantities in the most friable clays. The red sand is suspected to promote a binding quality in clays, as the binding soils have frequently what is termed a red *rosiny* appearance. We have an old proverb in this county:

Clay upon sand, will buy house and land,
But sand upon clay, is money thrown away.

Sixty-seven square yards of clay (which contains much sand in its own composition), will cover an acre of ground no more than half an inch in depth, and yet add much to its fertility, while an equal quantity of sand would be very far indeed from turning a hard heavy soil to a light one. On very light sands, it is evident the stronger the clay that is used, the greater improvement will be derived from it; but the farmer should consider whether, by the aid of frosts, &c. he shall be able to mix it well with the soil, as it is not uncommon to see lumps of clay two inches in diameter, which have been laid on the land six or seven years. The milder clay, or marl, which is generally preferred,
mixes

mixes easily with the soil, but is probably sooner washed into the subsoil than the stronger kinds.

The utility of clay is generally supposed to last about 20 years, though in very light sands it ought to be renewed in much less than half that time. When land has received clay at two different periods, to the amount in the whole of 120 cubic yards, the effect will not be entirely lost in a century.

“Pliny says, with the Britons marl lasted eighty years; and Lord Kaim gives an instance of two ridges marled 120 years ago, which remained better than the rest at that time.”

Some of the sands of Liddington which have been marled, are inferior to others in some parts of the county, which are, as far as appears, in a state of nature.

Other parts shew evidently the good effects of marl, which was laid on them between thirty and forty years ago; and a disposition to *bind* is still observable in some places, which were manured with a reddish clay containing but little chalk, nearly fifty years since.

The nutritive power of fossil manures is little known, though it has been made the subject of much dispute. It is generally agreed, that pit sand is incapable of acting as a manure, and the farmer who fears to disturb a particle of a clay substratum, will surely never set his teams to work to cover his manured tilth with a substance on which nothing except perhaps a thistle can exist. The only substance which remains to be considered, is chalk in its various shapes. Chalk is contained in marl, in the proportion, perhaps, of from ten to twenty per cent. and this being the only substance which can be useful to a clay soil, is it not rather extraordinary, that the virtues of pure chalk,
not

not adulterated as in marl with the addition of four-fifths of useless clay, should have been called in question?

Such are the fruits of trusting to that delusive guide, *local experience*, where a few well-conducted experiments might prove the fact to demonstration. Charcoal, when dissolved in the acid principle, is known to be the most fertilizing substance in Nature. Now charcoal is, as before stated, contained in chalk, in the state desired, and in the proportion of forty per cent.

If a hundred pounds of chalk are subjected to the action of fire, as in a lime-kiln, they are reduced to sixty, by the loss of 40 lb. weight of charcoal dissolved in the carbonic or aerial acid, and the caustic lime which remains, has not been proved to possess any intrinsic fertilizing power.

Mr. Smith, of Kimbolton, has seen the use of lime where it is extensively adopted, yet he believes it is no manure, but a stimulus only. On the other hand, Mr. Pickford, of Market-street, who has had experience in the use of both lime and chalk, and seen much in other counties, believes that chalk does not act as a manure, but that lime affords direct subsistence to the growth of vegetables.

Opinions so various as the above, if they prove any thing at all, it is perhaps that agriculture must derive its ultimate improvement from chemistry, though it must be confessed it has obtained little from that source at present.

The fertilizing power of either chalk or lime, considered as manures, is a doubtful subject, and cannot be intelligibly explained in this place.

The

The effects of both chalk and lime in other respects, are however too important to be overlooked.

New lime has a caustic dissolvent property; it destroys couch, insects, &c. and reduces the roots of grass and other vegetable matter to a kind of coal. Hence may be seen its great and striking effects on new ploughed land, and particularly on peat-mosses. On poor soils, which contain little vegetable matter, the dissolvent nature of lime has no power to produce a crop. It has in fact nothing to dissolve.

The dissolvent quality is in some measure possessed also by chalk, as the manure is said to be soon lost, or *swallowed* by hungry chalk soils. A property of neutralizing acids is common to chalk and lime, and will be beneficial on sour clays. If what are called sour or sedge grasses, derive their support from the sulphuric or other acids in the soil, the use of lime or chalk will contribute to destroy them. On sandy soils, it is confidently asserted, that either lime or chalk will destroy the wild sorrel, and the corn-marigold. Proofs of this fact, I am informed, have been seen on the sandy hills at Brickhill, in Buckinghamshire, and in other places. If the canal which has been proposed, should ever be completed in the line of the sandy district from Biggleswade to Fenny Stratford, the use of lime may be extended in this county.

Yard-Dung.—This is the principal, and indeed the only manure, used by most of the farmers to the north of the Chiltern-hills. A great diversity prevails in the management of this important article, and while the opinions of more scientific men than the Bedfordshire farmers pretend to be, remain unsettled and discordant,

cordant, it is presumed they are not imprudent in taking that side of the question which is the least expensive. As the farm-yards are mostly contiguous to the roads, which pass in general along the lowest ground, there seems scarcely one instance in thirty, in which the washing of the dung-yard could be conveyed upon the land by gutters, and perhaps not one in a hundred, where it is actually made use of in any shape. Some farmers entertain an opinion, that these washings of dung, though of a dark colour, are in most instances so diluted with rain, that they are not worth the expense of their carriage. Where there are ponds in farm-yards, this brown beverage appears to be much in esteem by the horses, which if used to it, appear frequently to set little value upon pure water. Some farmers in Hockliffe distribute their dung-water on the sward, by permitting it to trickle slowly between two ill-jointed boards, which form a kind of trough that receives it from the water-cart. A person who mowed some of the grass where it was thus sprinkled, informed me, that the grass was very soft and luxuriant; the noise of the scythe could scarcely be heard. There needs, I conceive, no argument to prove that this liquid solution of carbon and animal salts, is of some utility; but I hear of no experiments to ascertain its value. Mr. Grant, of Leighton, I observed in the practice of absorbing the drainage of the-dung by means of carting peat into his reservoirs, which thus becomes a good manure. A few others are in the practice of using mould from road-sides, &c. in the same intention, and wherever circumstances will permit, much profit may be thus obtained.

The bailiffs of some of the principal proprietors, and a few others, are in the habit of carting their yard-

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dung into heaps, and turning it once or twice; but I believe a great majority of the farmers incline to the opinion, that dung ought to be thrown up into large heaps, either in the yard or the field, to receive a due fermentation: in this state it is carried upon the land. There are nevertheless a variety of circumstances which make practice and opinion at variance; in consequence of which, I conceive, that more than half the yard-dung in the county is carried to the land without any previous preparation. In the open fields it is usual to lay the dung on the fallows in June; or as soon as the fallows have been broken up, and very few either wish, or have it in their power, to cover it with the plough before its juices are evaporated.

The apprehension that dung loses much of its virtues by evaporation, is not entirely unknown or unattended to in this county; but there are those who think very differently on this subject. Several farmers maintain, that ploughing as soon as it is laid upon the land, is unnecessary, if not injurious, because they say it absorbs the nightly dews, and other unknown substances from the atmosphere, with which the soil becomes gradually impregnated. Manure spread on the surface of clay soils keeps them in a moist state, and makes them plough free and mellow.

In the manuring of sward, it is generally agreed that it is most effective when laid on soon after the hay has been cleared from it.

The experience of this county as well as others concur in this point; but I think very few have any hope that the grass will thus grow through, and cover the dung, before the sun has had leisure to exert all his much-dreaded influence upon it.

It has been said, that the sense of smell is sufficient
to

to prove that more than water evaporates from dung; but it is also known, that the *aroma*, or odoriferous principle, is a substance almost inconceivably light.

The weight of dung is diminished by the power of water, fermentation, and evaporation.

By ablution, or washing in water, the whole of the stimulating urinous salts are instantly dissolved, and being conveyed into ditches and rivers with the water, are entirely lost.

Neither is this the only loss, for the colour of the water shews that it is impregnated with soluble carbon, the quantity of which substance in dung, is exactly in proportion to its rottenness, as the rest will be proved by washing to be mere straw. On the other hand, the loss arising from evaporation is comparatively trivial, as water is capable of dissolving ten times as much of the remains of vegetables as will accompany it into the air in a state of vapour.

The process of fermentation disengages a great quantity of carbonic acid, and ammonia, or volatile alkali, by which the weight of the manure is much lessened, but its value increased. After about six weeks fermentation, it assumes a saponaceous greasy appearance, and in this state it is applied to the land by the best farmers in this county. Those who choose to give it repeated turnings, and keep what has been termed *over-year muck*, must probably submit to lay ten loads per acre instead of twenty or thirty. There is even reason to believe, that dung laid in heaps for only six months, loses half its weight and much of its value; but such as has been heaped from one to two years, I have been informed, has sometimes appeared to produce no effect whatever on the land where it was applied. If this county produces a few who may be

said to lessen the quantity of manure as much as possible, it is probable the public inns will furnish some advocates for straw scarcely discoloured by the horses. I observed some manure of this kind spread on the lands near Dunstable, and was told it was a matter of course, and done to save trouble. On the whole, there is reason to believe that dung, like every thing else, will pay for some attention and management; but there is in all things a certain point, where resides the maximum of profit, beyond which is nothing but loss.

The yard-dung in this county commonly belongs to the farm, and of course its saleable or intrinsic value is little known.

A few years ago, dung was sold at Market-street at 7*s.* or 8*s.* per load. Mr. Foster, at Bedford, gives 5*s.* per load for good town manure. Butchers' dung, which is probably more valuable than most others, is sold in some of the villages at 6*s.* per load. In the average value of yard-dung opinions differ from 2*s.* to 4*s.*; but I believe the common opinion inclines to about 3*s.* per load, or ton weight; and it is probably worth almost half that sum to carry it to the land. The dung of various animals differs considerably in value; but in general, that of the corn-eating, or fattening animals, will be much superior to most others.

The dung of swine, while feeding on corn and milk, is in great estimation; but much of the urine of that animal (particularly in dairy farms) passes directly into some ditch or brook, and is entirely lost to the farmer, for the want of reservoirs or litter to absorb it.

Horse-dung, when not too much adulterated with long straw, is extremely valuable, but it is inferior to that of swine; and sheep's-dung, though highly prized in Bedfordshire, is probably inferior to that of horses.

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The food of the cow and sheep is similar; yet the manure of the cow is generally of an inferior quality. This is peculiarly the case with cows which feed on straw, or which, by yielding much milk, become thin of flesh, but when corn or oil-cake is given to feeding beasts, their manure is materially improved.

Pigeons, and most of the feathered tribes, being chiefly supported on seeds (in which reside the most nutritious principles of vegetation), produce a manure which, when mixed with others, promotes their putrefaction, and is of more value than many seem willing to believe.

All the animals above-mentioned, are concerned in some measure in the production of yard-dung, in a variety of ways too tedious to describe in this place; but the two extremes of eating all the straw, or none of it, are I believe equally unknown in this county.

Green Crops.—The manure produced by ploughing down green crops, such as clover, buck-wheat, tares, &c. has been considered in the Section on Tares, where it is supposed that six tons of green tares would not weigh more than five tons, if they contained no more water than common yard-dung; and as they are worth 50s. for feeding any kind of cattle, it is evident they must be worth 50s. as manure, or the cultivator must suffer a comparative loss by this mode of application.

Several farmers in this county have tried and approved the practice; but it is remarkable, that this approbation does not produce any effect in one instance in ten.

Mr. Raven, formerly of Ridgmount, is said to have tried a singular variety of this kind of manurance:

his practice was to sow half a peck or more of turnip-seed per acre on a sandy summer-fallow, which after growing a few weeks, was ploughed down, and rye immediately sown and harrowed in. The success of this method was said to be considerable; but it does not appear to possess any merits that are likely to supplant the modern system of turnips and barley.

There is no doubt that green vegetables act as a manure in some degree, returning to the land more than is extracted from it by their growth, the quantity of which philosophical experiments must ascertain, if it be ever known. But they have also a mechanical effect, in loosening the soil with which they are mixed, which, however useful on strong land, will scarcely be deemed equally beneficial to sands and gravels. There are some, who think the manure made by feeding of green crops equally valuable as that made by ploughing them down to ferment in the soil; but whether this opinion be strictly correct or not, there are few who will value a ton of green vegetable manure at 10*s.* when the value of good yard-dung, carriage included, does not exceed 4*s.* 6*d.* per ton or cart-load.

Peat-Ashes and Peat-Dust.—The use of these substances as manures has prevailed for some years, and seems to be on the increase, particularly in the chalky district of this county. The bog from which the principal part of this manure is derived, is in the parish of Tingrith; but much peat of a similar nature is found near almost every stream of water in the sandy district.

The water which oozes from the sandy hills on the sides

sides of the peat-mosses, is much impregnated with a vitriolic solution of iron, which gives the peat that peculiar character which is not commonly found in the peat of many other districts.

It is easy to conceive, that the partially stagnant water which first produced and still feeds these sulphureous bogs, would become impregnated with iron, by filtration through strata of red sand; but these waters contain also much sulphuric acid, without the aid of which, the iron held in solution would not be very considerable.

It does not appear that modern chemists have been able to explain the process of Nature in the formation of sulphuric acid, which is so abundant in the peat of this county; but the first indication of it is, perhaps, to be seen in the various-coloured oily film which appears on the surface of bog-water, and, indeed, on every stagnant puddle which filters through a loam containing red sand.

In the sands and loams about Liddington, numerous instances have been observed, where the clods in the low and springy parts having been long kept in a moist state, became, after the first drying winds, almost covered with a white saline substance.

This saline matter always makes its appearance on the surface of peaty soils, when they are becoming dry, even on such parts as bear a variety of coarse productions, and are capable of bearing corn; but there are some parts in which the vitriolic solution most abounds, where, whether drained or undrained, no vegetable will grow. Corn sowed in such situations, after sprouting a few inches, turns yellow, and dies away; and ash-trees, willows, &c. though capable of a flourishing growth on the better kinds of peat, will

here become blighted and unthrifty, if they even preserve a feeble existence.

Some people assert, that true sulphur is found on the surface of the most barren parts of the moors, which is perhaps not strictly correct. This matter, which collects in considerable quantities, is of a yellowish colour, and in appearance much like brimstone; it will easily crumble to pieces, but it is so far impregnated with the acid principle and iron, as to be incapable of burning in the fire.

At the request of Mr. Willaume, of Tingrith, Dr. Pearson analyzed the peat-dust, &c. and communicated a full and correct account of the circumstances attending its use as a manure, to the Board of Agriculture. The substance of his account is as follows:

Peat-Dust—This dust is a grey saline substance, obtained by beating the earth which contains it to a powder. It is found in particular spots, the earth not affording it equally in all places. It has been known as a manure above six years, and on trial, increases in reputation and demand. By the operation of divers re-agents, it was clearly ascertained that it consists of sulphate of iron for the greater part, with a little lime united to sulphuric or carbonic acid, and a minute proportion of siliceous earth; and that there is no trace in it of magnesia, argil, or the uncombined alkalies.

2. Fifty bushels of this dust are the proper quantity per acre. This should not be exceeded, as a too great abundance has a deleterious effect.

3. It is used for clayey or wet lands in the chalky district.

4. On grounds of this kind, of a cold nature, it much improves the vegetation of sowed grasses and old pasture, and the production of corn.

5. It

5. It is not mixed with lime, or any other substance.

The farmers send waggons for this dust from some distance, and higgler likewise buy it, and carry it for sale many miles, as also the ashes procured by burning the surface of the peat.

Peat-Ashes.—The turf or surface, and such parts as do not appear to be of the best quality for domestic fuel, are laid up in considerable heaps, and reduced to ashes, which are of a red colour.

1. These ashes have been long used as a manure, and their demand is on the increase.

2. The quantity used per acre is 50 bushels.

3. It is laid on gravelly, sandy, or chalk soils of a dry nature, such as are burnt up by a long continuance of hot weather. It is commonly used for grasses, but is in considerable esteem also for oats or barley, on land of this description.

4. The fertilizing effect of it is surprising, as it will double or treble a crop of new sown grass, such as trefoil. It effectually destroys moss on old pastures, and produces Dutch clover in its place.

The effects of this manure may be traced to an inch, so strong is the contrast of the appearance of the manured and unmanured places.

Near the fire-heaps, as far as the ashes are driven by the wind, the production of white clover is sure to be abundant. These ashes are equally favourable to the growth of barley or oats.

5. They are not mixed with lime, or any other manure.

These ashes are carried by higgler on asses in sacks, to such distances, that they must come very dear to the consumer.

Peat.

Peat.—The peat itself is used as fuel by the poorer sort of people, on brick hearths : it is dug in the usual form for this purpose, one spade's depth.

"The peats for fuel are cut 20 inches long, and four square, and are sold at 10*s.* 6*d.* a thousand ; costing 1*s.* 9*d.* for digging, and as much for drying.

"Four thousand inches square of bog thus yielding 7*s.* shews the immense value of this application of an acre."—*A. Y.*

This matter renews itself again in about 15 years, and the whole moor is divided into proper portions, and periodically cut once in that period : if the usual depth be exceeded, the re-production is prevented. Some of the poor seem to prefer the upper spit for fuel, as the sulphureous smell is in this less disagreeable. In a letter from Mr. Anstey, of Houghton Regis, it appears, that he has used the peat-dust and ashes of Tin-grith-moor for above 30 years, as a manure, and lays on sometimes from 80 to 100 bushels per acre. It encourages vegetation in moist warm weather, but the reverse in hot dry weather. The land in Mr. Anstey's neighbourhood, where it is used, is dry and thin stapled, the chalk rock lying near the surface.

Such is the substance of the information which has been given to the public.

In 1806, I find this manure increasing in credit.

The dust is sold at the moor at 1½*d.* per bushel, and the ashes at 2*d.*, which, with the carriage to Sundon, Houghton Regis, &c. amounts to 4*d.* and 5*d.* per bushel. Some of it has been carried to Beechwood, and other adjacent places in Hertfordshire, where the expense attending it would, in some instances, amount to 7*d.* or 8*d.* per bushel.

There seems to be no doubt of the utility of peat manure

manure on chalky soils, where the combination of sulphuric acid with chalk expels the carbonic acid, and forms gypsum, a process which, there are many reasons to believe, cannot fail to promote vegetation; but on the sands and clays, which contain little or no chalk, and where the expense is a mere trifle, it is so little used, that many have scarcely formed an opinion of its merits. Mr. Aikin, of Elstow, in his letter to the Board of Agriculture, says, "Artificial manures are rarely made use of. I have made trial of turf-ashes, delivered at 5*d.* per bushel, 50 bushels per acre; and also *unburnt* turf-dust, delivered at 4*d.* per bushel, and the same quantity per acre, with tolerable success."

Mr. Runciman, of Woburn, thinks peat-ashes useless or injurious on his sands; and a farmer of Eversholt, who has tried 40 bushels, observed little if any difference on the grass where they were laid.

They are commonly laid on clover or grass; and their effect, where they are said to be useful, is, to increase the growth of white clover, and to produce it where none grew before—an effect which, it is observed, is common to all the *cold* manures, as ashes of every kind, and lime.

Some people are inclined to dispute the notion that lime is a cold manure; but the theory which passes current in this county is, that every thing which has passed through the *fire* must be cold. On this principle Mr. Carr, who is the manager of Prisleigh-farm, accounts for the effects of peat and peat-ashes. The peat-dust, he affirms, is a hot manure, and therefore useful on the cold chalky soils, and on clays; but decidedly pernicious on the hot sands and gravels: but when the peat has passed through the fire, it is *cold*,
and

and in this state he has experienced its utility on sands.

This theory (though apparently a very defective one) is sufficiently in accordance with facts, so far as peat is concerned. It is evident, that by hot and cold soils is meant no more, than that they easily part with, or obstinately retain, the water which falls upon them; but it does not appear, how the hot and cold manures can counteract these unfertile properties.

It is much to be wished, that such as have a sufficient knowledge of chemistry and agriculture, might be employed to investigate this intricate subject, which is obviously beyond the reach of the common farmer.

If such are cold manures which have passed the fire, which were hot manures before, this practical distinction will shew, that every alkaline substance, as soda, potash, aminonia, lime, magnesia, and perhaps the other earths, and all the metals, are cold manures; while the same substances combined with acids, as common salt, nitre, sal ammoniac (or muriate of ammonia), chalk, gypsum, Epsom salt, alum, sulphate of iron (or peat-dust), &c. are of a hot quality, and injurious to light dry soils.

Some of the inferences from the above theory would certainly meet with much opposition; but experiments on a very small scale might be made, the result of which might give a satisfactory decision to the question. Experiments made in small pots are, without much care, very delusive, though much may be proved by that means only, if due attention be paid to the quantities used. The ill success of some manures tried in this way, has sometimes been caused by the great and undue quantity employed. Gypsum, for instance, which is said to be useful, if sown after the rate of seven bushels

bushels per acre, might exhibit a different result, if 700 bushels were laid on the same space of ground. The vitriolic peat, which permits nothing to grow on its surface, contributes much to the fertility of chalky soils, if used in due quantity; and the calcined peat, or colcothar of vitriol, which differs but little from rust of iron, must not be used with unlimited profusion, notwithstanding its supposed cold quality.

As it is known that lime may be burned by the use of peat instead of coal, it is rather extraordinary that so cheap a substitute has not been adopted.

In the lime manufactured with vitriolic peat, a part of the acid would combine with the lime, and form sulphate of lime, or gypsum, a substance which would probably render the lime more useful as an application to land. The lime thus produced on the spot, would be extremely beneficial in the improvement of the peaty soils which are cultivated; and if mixed with unburnt peat, so as to reduce it to charcoal, it would form a valuable compost for much of the soil in the neighbourhood.

Ashes of Wood and Coal.—These are used in some measure by almost every farmer, and are well known to be very effectual in sweetening the herbage, killing the moss, and producing a plentiful growth of the white honeysuckle.

Seeds.—The seeds of vegetables are the most nutritious part of their substance, and approach in several instances nearly to the nature of animal flesh, which is the richest of all manures. Hence, it may be expected that seeds of every kind, but more particularly the oily and farinaceous kinds, will, when deprived of
their

their vital or vegetative principle, contribute much to fertilize the soil on which they may be laid.

In conformity with this opinion, the seeds of various weeds collected in dressing the corn, and laid in heaps to ferment, have appeared in several instances to be as rich a manure as yard-dung, impregnated with the usual animal matters.

London Manures.—In addition to the common farm-yard manures, the chalky district is supplied with various light dressings from London, and there are some instances of gentlemen farmers at greater distances, as, Sir Hugh Inglis, of Milton Bryan, G. Edwards, Esq. of Henlow, &c. who have made use of London manure; but the expense in such cases must leave little hopes of ultimate profit. Mr. Thompson, of Sundon, expends nearly a pound per acre, or 300*l.* per annum, in purchasing manures, and adds, that they are forced to purchase a crop of wheat ere they have it; and an opinion nearly similar is given by — Young, Esq. at Hexton.

Mr. Edwards, of Henlow, in a letter to the Board of Agriculture, mentions having used hair and hoof from London at 7*s.* per quarter, bringing 30 quarters at a time in a waggon; as also rags at 8*s.* per cwt. if new and good; 5 cwt. of which will do an acre.

Clippings of various kinds are used as a manure for the wheat crop at Dunstable; the large pieces are chopped with hatchets. The cost of this manure, which is said to be very effectual, is 1*l.* per quarter, three of which are used on an acre.

At Luton, soot from London is laid down at 1*s.* 2*d.* per bushel, and it is thought that 40 bushels will increase the produce of wheat at least five bushels per acre, with some advantage to the subsequent crop.

Soot

Soot is called a hot manure, but I am informed it has been used on some cold clays without producing any apparent benefit.

At Luton, a quantity of hair, bones, feathers, &c. which had become full of maggots, and were not completely covered, attracted to the spot (my informant thinks), a hundred ravens.

*Experiments on Manures, by Dr. CARTWRIGHT,
of Woburn.*

Having appropriated half an acre to this set of experiments, Dr. Cartwright divided it into 60 equal parts, consisting of 40 square yards each, which were planted with potatoes on the 14th of April, 1804, and each part received an equal number of sets.

The soil was sandy, and appeared on analysis to contain the following component parts :

Four hundred grains gave of siliceous sand, of	<i>Grains.</i>
different degrees of fineness, about	280
Of finely divided matter, which appeared in the	
form of clay,	104
Loss in water,	16
	400

The 104 grains of finely divided matter con-	
tained of carbonate of lime (or chalk),	18
Oxyde of iron,	7
Lost by incineration, most probably from vege-	
table decomposing matter,	17
Remainder, principally silex and alumine,	62

There was no indication of gypsum or of phosphate of lime.

The

The quantities of each kind of manure that was made use of, are as follows: sulphuric acid, three ounces; sea salt, a quarter of a peck; lime, one bushel; gypsum, a quarter of a peck; soot, one peck; wood-ashes, two pecks; saw-dust, three bushels; malt-dust, two pecks; peat, three bushels; decayed leaves, three bushels; fresh dung, three bushels; rotted dung, one bushel; bone-dust, one peck; chandler's greaves, nine pounds; and the quantities of each manure were the same, whether used singly or in combination.

On the 21st of September, when they were all taken up, the order of precedence was as follows:

<i>No. of Experiment.</i>	<i>Kinds of Manures.</i>	<i>Produce. lbs.</i>	<i>Gain. lbs.</i>
35.	Gypsum, graves,	250	93
41.	Soot, salt,	240	83
21.	Lime, malt-dust,	239	82
18.	Lime, soot,	231	74
39.	Soot, dung,	228	71
40.	Soot, peat,	225	68
34.	Gypsum, peat,	222	65
15.	Graves,	220	63
26.	Lime, graves,	219	62
44.	Wood-ashes, salt,	219	62
37.	Gypsum, wood-ashes,	218	61
43.	Wood-ashes, peat,	217	60
16.	Lime, sulphuric acid,	213	56
45.	Wood-ashes, decayed leaves,	213	56
47.	Wood-ashes, malt-dust,	213	56
42.	Wood-ashes, dung,	210	53
46.	Wood-ashes, bone-dust,	208	51
33.	Gypsum, dung,	207	50
36.	Gypsum, bone-dust,	206	49
38.	Gypsum, dry leaves,	205	48

13. Rotted

<i>No. of Experiment.</i>	<i>Kinds of Manures.</i>	<i>Produce. lbs.</i>	<i>Gain. lbs.</i>
13.	Rotted dung,	201	44
32.	Lime; salt, gypsum, peat,	201	44
30.	Lime, salt, dung,	199	42
3.	Salt,	198	41
56.	Decayed leaves, dung,	198	41
60.	Graves, salt,	195	38
31.	Lime, peat, dung,	194	37
14.	Bone-dust,	193	36
6.	Soot,	192	35
12.	Fresh dung,	192	35
25.	Lime, bone-dust,	190	33
50.	Malt-dust, salt,	189	32
24.	Lime, dung,	188	31
7.	Wood-ashes,	187	30
55.	Decayed leaves, salt,	187	30
19.	Lime, wood-ashes,	185	28
58.	Peat-ashes, salt,	185	28
9.	Malt-dust,	184	27
29.	Lime, salt, peat,	183	26
51.	Peat, dung,	183	26
57.	Peat-ashes, dung,	183	26
48.	Saw-dust, dung,	180	23
49.	Saw-dust, salt,	180	23
22.	Lime, peat,	179	22
5.	Gypsum,	178	21
54.	Peat, bone-dust,	178	21
11.	Decayed leaves,	175	18
28.	Lime, sulphuric acid, salt,	175	18
53.	Peat, decayed leaves,	172	15
23.	Lime, decayed leaves,	171	14
52.	Heat, salt,	171	14
59.	Peat-ashes, lime,	171	14
2.	Sulphuric acid,	170	13
BEDS.]	m m	17.	Lime,

<i>No. of Experiment.</i>	<i>Kinds of Manures.</i>	<i>Produce. lbs.</i>	<i>Gain. lbs.</i>
17.	Lime, salt,	167	10
20.	Lime, saw-dust,	166	9
10.	Peat,	159	2
1.	No manure,	157	0
			<i>Loss.</i>
8.	Saw-dust,	155	2
4.	Lime,	150	7
27.	Lime, pond-mud,	150	7

Dr. Cartwright has commented at some length on the various particulars of this set of experiments, in an Essay which is inserted among the Communications to the Board of Agriculture, and for which he was honoured with a gold medal.

A heaped bushel of potatoes, weighs about 60 lbs. and as each experiment was made on $\frac{1}{128}$ th part of an acre, the produce in pounds, represents half the number of bushels which would have been produced from an acre, if managed in the same way. The gain in the produce by the use of manure, as represented in the second column, is also to be doubled, to shew the number of bushels which would have been gained from an acre.

A few experiments of this kind, the results of which may be confirmed by careful repetition, or more properly, by conducting three or four experiments of the same kind, at the same place and time, would promote scientific agriculture, more in five years, than plodding dullness, miscalled experience, will ever achieve to the end of time. The value of the set of experiments here recorded, would have been more than doubled, had they been repeated to shew the durability of the various manures, but unfortunately, those who possess the ability to conduct experiments, seldom feel any adequate

quate stimulus to persevere in that path which leads to private loss, whenever it is not supported by public reward.

Many important observations relative to the art of husbandry may be deduced from Dr. Cartwright's experiments. Thus, from No. 15, it appears that 1080 lbs. of chandler's greaves, if spread on an acre of ground, may produce in the first season 7560 lbs. of potatoes, from which 1260 lbs. of starch might be procured.

CHAP. XIII.

LIVE STOCK.

SECT. I.—CATTLE.

“THE cattle bred in this county are, for the most part, of a mixed kind, differing, according to various mixtures, from the Holderness, Lancashire, and Leicestershire, to the Alderney sorts; and as it has not been a general practice to attend nicely to the breeding from the best of any particular sorts, we find them of a very inferior nature, but most particular with regard to their intrinsic value of feeding for beef, *after the first intention for the dairy is over*; a circumstance which, it is presumed, ought to be weighed by those breeders who are desirous of making the greatest profit by their occupations. We generally find them large in their heads, bones, and bellies, and coarse in their horns, throats, and necks; narrow in their hips, plates, chins, shoulders, and bosoms, and high in their rumps; and consequently wanting that due width and symmetry of body, which carries with it the inherent aptitude to become fat, with a smaller proportion of nutritious aliment, in a much less time than would be required to render others marketable. From animals of the foregoing description, therefore, much less profit is derived by the grazier, than might be fairly computed upon, were more attention paid to the breed of cattle than at present.”—Such is the representation of
Mr.

Mr. Stone, as given in the original Report of 1794. At the present time, Bedfordshire, though occupied by many good farmers, makes no pretensions to any peculiar or excellent breed of cattle.

Broad-horned cows are kept in many parts of the county; but a rather general opinion seems to prevail among many of the principal dairy farmers, in favour of the large Holderness short-horned breed.

They are generally called Yorkshires, in this neighbourhood, and are purchased in that county by professed dealers. Many others are obtained from the Fens, &c. being purchased at St. Ives' market, in Huntingdonshire. Neither breeding nor fattening of calves is carried to any great extent, but principally in the neighbourhood of Biggleswade, and the chief dairy district is in the west of the county, consisting in many of the towns which surround Ampthill and Woburn. Those who keep the short-horned cows are not unseldom observed to prefer a bull of an opposite description; as, though the Yorkshire cows are much esteemed for the purposes of the dairy, they are thought less disposed to fatten; and their calves, which are generally sent to Leighton-market, and sold for the purpose of suckling, are deemed to possess the usual qualities of the breed from which they are derived. Very little butter is made in the north of the county, except what is required for family use. Much of the grass land is very poor. Mr. Wilson, of Ravensden, observes, that a milch-cow will scarcely maintain her condition in that neighbourhood.

Food.—Artificial food, such as chaff, turnips, &c. is seldom used. The summer food is principally natural pasture. Red clover is found to be a very impro-

per food for milking cows, as, though it does not diminish the quantity of the milk, it makes it poor in quality, as has been sufficiently experienced at Lidlington. It is supposed that more than one half of the pasture grounds which are appropriated to the dairy, must be annually mown, to support the cows in winter; but they are often supplied with clover-hay, and the clover, in its dry state, is not supposed to injure the quantity or quality of the butter. Mr. Platt, of Lidlington, supposes that a cow will require two acres and a half of pasture, worth 35s. per acre, for its support through the year, consuming in the winter $2\frac{1}{2}$ cwt. of hay per week.

Dairying.—Where the quantity of cows is not very considerable, they are commonly milked between the hours of five and six, both in the morning and evening, and the milk is kept in *leads*, or sometimes in wooden *kivers*, of a shallow construction.

The butter is generally churned twice a week, and sent to London the succeeding day, by the common carriers, or provision waggons. The carriage is paid by the London dealers, who purchase the butter for half a year, or sometimes a year, at two different prices, which have varied within the last few years between 12d. and 15d. per pound. The money is commonly returned once a month.

The inferior kind, which is called *under-butter*, or *after-butter*, is taken at the regular price, as this is the only mode to improve the quality of the prime sort.

The utmost attention to cleanliness is indispensable to the making of good butter, which is doubtless the occasion of its bearing a much higher price than other animal food of equal or superior nutritive qualities.

Produce

Produce of a Cow.—The quantity of milk produced by a cow, on the average, is probably as little known as any subject connected with agriculture.

I am informed that, thirty years ago, it was a common opinion that a cow would produce, on the average, 6lb. of butter per week in summer, and 3lb. in winter, or 5lb. for 40 weeks in the year; and the skimmed-milk was supposed to be worth 2s. for each dozen of butter, which sold from 6s. to 8s. per dozen. It was further supposed, that cows with their third calf would produce 1 lb. of butter per week more than heifers, and that three old cows, whose bellies were become heavy, would consume as much as five young ones. Some calculators of the expenses of keeping cows, mention something for their decline in value, but the practice of the best farmers in this county consists in buying of young heifers, and sending them to London before they begin to decline, either in milk or carcass. The produce of young cows in butter will be rather small, but they also improve in value, after the rate of 2*l.* 3*l.* or even sometimes 5*l.* in a year.

The cows ought to obtain their full growth in the country, for obvious reasons; but the London cow-keepers are amply repaid for their *decline in value*, by the price which they receive for the milk, which is at least twice as much as it is worth in the country.

The following account of the produce of cows is extracted from Mr. Young's *Annals*, vol. xxxii. It may be here observed, that the account was deduced from the tithes which were taken in kind in a village in Bedfordshire.

“ 1335 cows, in a very wet summer (1797), which never suits dairying, gave 1583 $\frac{1}{4}$ gallons of milk; and in winter, 1235 cows gave 1362 $\frac{1}{4}$ gallons of milk,

m m 4

which

which is something more than one gallon and one pint per cow per day for the average of the year. The result of the former average combined (for 1796), was one gallon and three pints and a half.

“The butter in the following accounts is calculated at 11s. per dozen.

In the year 1796.

<i>Gallons.</i>		
3674 of milk made 104 dozen of but- ter, at 11s.	}	£.57 4 0
3364 of skimmed-milk, at 2d. per gallon, (Deducting a quart of cream for 1lb. of butter).		28 0 8
Cream, cream cheeses, &c. used,		6 12 4
3674 of milk, at 6d. per gallon,		£.91 17 0

“Two gallons seven pints and a half of milk made one pound of butter.

In the year 1797.

<i>Gallons.</i>		
3015 of milk made 101 dozen of butter, at 11s.	}	£.55 11 0
2712 of skimmed-milk, at 2d. per gallon, (Deducting a quart of cream for 1lb. of butter).		22 12 0
Cream, cream cheeses, &c. used,		6 13 0
3015 of milk, at 6½d. per gallon,		£.84 16 0

Two gallons ¾ pints of milk made 1lb. of butter.

<i>Year.</i>		
1796. The average produce of a cow, } 431 gallons, at 6d.	}	£.10 15 6
Calf,		0 15 0
146½ lb. of butter,		£.11 10 6

“The

“ The calves are contracted for, to take all that fall in the year at one week old.

<i>Years.</i>				
1797.	The average produce of a cow, }	£.9	15	0
	347 gallons, at 6½ <i>d.</i>			
	Calf,	0	15	0
	140 lbs. of butter,	£.10	10	0
1793.	Two old cows produced in }	£.18	18	10½
	butter and calves,			
1794.	The same cows,	17	3	0½
1795.	The same cows,	14	0	6
		£.50	2	5
	From 1 lb. to 3 lbs. of butter per			
	week used ; state 2 lbs. for }	14	6	6
	156 weeks,			
		£.64	8	11
	The yearly produce in butter, }	£.10	14	9½
	and calf,			
	If the skimmed-milk be valued }	4	8	8
	according to the mean pro- }			
	portion before noticed,			
		£.15	3	5½

“ The first description includes cows of every denomination, and under every species of management (with the additional disadvantages in point of produce which always attend a parochial warfare on account of tithes); the latter, of two old cows, beginning to fail in milk, but having plenty of good keep in summer, and well foddered on hay in winter. Let the difference of their produce

produce point out the consequence of keeping stock in full profit. The same expense in keep and management, occurs for a bad cow as a good one; but 5*l.* per head difference, will make an essential consideration in even a small dairy."

The estimates of a cow's annual value, as taken (I believe in evidence), on account of the tithe, which was made the subject of an appeal to the law, are as follows :

1798.

J. W. Jennings, Esq. (butter at 10 <i>d.</i> } and 11 <i>d.</i> per lb.),	£.10 10 0
Mr. Burge, { Cow, £.10 0 0 { Calf, — 15 0	
	10 15 0
Mr. Leach, 400 gallons of milk, at 6 <i>d.</i>	10 0 0

The annual expense of keeping a cow was also stated in the same account from which the above is extracted, as follows :

Three acres of grass land, worth 30 <i>s.</i> per acre (in 1798), will be barely sufficient } to keep a cow,	£.4 10 0
Rates at 5 <i>s.</i> in the pound,	1 2 6
Tithes of hay,	0 6 0
Vicarial tithes,	0 10 0
Mowing, making, and stacking hay and } foddering,	1 1 0
Interest of 15 <i>l.</i> the cost of a cow, for risk } and losses, 10 per cent.	1 10 0
	£.8 19 6

An

An Account of the Produce of the Dairy of 29 Cows belonging to His Grace the Duke of Bedford, from June 1st to October 26th, 1805.

Weeks.	Butter.	Cream.	New Milk.	Skim Milk.
	lb.	Quarts.	Quarts.	Gallons.
One week, -	68	28	57	33
Two weeks, -	169	0	145	67
Ditto, - -	162	0	182	52
Ditto, - -	196	5	234	62
Ditto, - -	179	5	365	59
Ditto, - -	140	16	455	59
Ditto, - -	130	36	505	72
Ditto, - -	114	24	381	66
Ditto, - -	109	39	138	59
Ditto, - -	102	29	140	78
Ditto, - -	94	36	145	68
	1463	218	2741	675

24 calves and 20 pigs were reared at the dairy.

Produce of Cows fed on Chaff by the late Duke of Bedford, May 1795.*

	Time of calving.	Chaff per Week.	Gallons of Milk.	Butter.
		lb.	Gal. qt. pt.	lb.
Two small cows, - - {	Jan. 23 {	448	22 1 0	9
	Feb. 5 }			
Two large cows, - - {	Feb. 17 {	602	32 2 1	11½
	Feb. 21 }			
One large cow, - -	March 26	290	20 0 0	12
One small cow, - -	March 31	222	9 2 1	5

Fatting.—Cattle are fattened on grass, where the land is sufficiently rich for that purpose, in various parts of the county. There are also a few instances of

* Annals, vol. xxxix.

feeding them with oil-cakes, in addition to the corn, hay, and turnips which are used by the generality of farmers in winter; but I have not been able to obtain any particular information on this subject, except such as has been already recorded in Mr. Young's *Annals*; a part of them are here inserted.

Experiment on Six Oxen, from November 16, 1797, to December 10, 1798, by the late Duke of Bedford.*

Kinds of Oxen.			Food given. Oil-cake, Turnips, Hay.	Food taken back, or Ofal.	Food consumed.
			lb.	lb.	lb.
No. 1. Hereford ox,	-	-	oil-cake,	—	—
			turnips,	3060	360
			hay,	530	43
No. 2. Hereford ox,	-	-	oil-cake,	450	26½
			turnips,	3040	328
			hay,	467	34½
No. 3. Devon ox,	-	-	oil-cake,	450	11½
			turnips,	3090	422
			hay,	376	81
No. 4. Devon ox,	-	-	oil-cake,	450	7½
			turnips,	3000	364
			hay,	475	32½
No. 5. Sussex ox,	-	-	oil-cake,	450	17½
			turnips,	3030	375
			hay,	443	51
No. 6. Leicester ox,	-	-	oil-cake,	450	15½
			turnips,	3010	358
			hay,	447	46½

* *Annals*, vol. xxxix.

Kinds of Oxen.		Live Weight Nov. 16, 1797.	Live Weight Dec. 9, 1798.	Live Weight gained.
No. 1. Hereford,	cwt. &c.	cwt. gr. lb. 17 0 1	cwt. gr. lb. 18 3 0	cwt. gr. lb. 1 2 27
	stones, 8lb.	st. lb. 238 1	st. lb. 262 4	st. lb. 24 3
No. 2. Hereford,	cwt. &c.	cwt. gr. lb. 18 1 0	cwt. gr. lb. 21 0 25	cwt. gr. lb. 2 3 25
	stones, 8lb.	st. lb. 255 4	st. lb. 297 1	st. lb. 41 5
No. 3. Devon,	cwt. &c.	cwt. gr. lb. 14 1 7	cwt. gr. lb. 17 2 7	cwt. gr. lb. 3 1 0
	stones, 8lb.	st. lb. 200 3	st. lb. 215 7	st. lb. 45 4
No. 4. Devon,	cwt. &c.	cwt. gr. lb. 14 2 14	cwt. gr. lb. 19 1 0	cwt. gr. lb. 4 2 14
	stones, 8lb.	st. lb. 204 6	st. lb. 269 4	st. lb. 64 6
No. 5. Sussex,	cwt. &c.	cwt. gr. lb. 16 2 0	cwt. gr. lb. 19 3 0	cwt. gr. lb. 3 1 0
	stones, 8lb.	st. lb. 231 0	st. lb. 276 4	st. lb. 45 4
No. 6. Leicester,	cwt. &c.	cwt. gr. lb. 15 2 14	cwt. gr. lb. 18 2 0	cwt. gr. lb. 2 3 14
	stones, 8lb.	st. lb. 218 6	st. lb. 259 0	st. lb. 40 2

Account of food eaten by the Duke of Bedford's ox,
 Sharper, from October 1, 1803, to November 30,
 1803 (both inclusive).

<i>Turnips.</i>	<i>No. of</i>	<i>Hay.</i>
	<i>Oil-cakes.</i>	
3120 lbs.	232	812 lbs.
		Offal, 37 lbs. taken back.

 775

3120 lbs.

3120lbs. of turnips, suppose at 4s. per	}	£.0 5 6
ton (a value that has in several experi- ments been ascertained),		
232 cakes, at 12l. a thousand,		2 15 8
775lbs. of hay, at 5l.		1 14 6
		£.4 15 8*

Account of food eaten per day, by the Duke of Bedford's cow, Peacock, from October 1, 1803, to November 30, 1803 (inclusive).

<i>Turnips.</i>	<i>Hay.</i>
3440lbs.	829 lbs.
	55 offal weighed back.
	774

The Duke of Bedford's Hereford cow, shown at Smithfield 1804, weighed 13cwt. 3qrs. 14lbs. (192st. 2lbs.) on leaving Woburn.

The quantity of food consumed by her from the 1st of October, to the 30th of November, was 288 oil-cakes, 3192 lbs. of turnips, and 518 lbs. of hay.

His Grace's Kentish cow weighed at Woburn, 14cwt. 2qrs. 14 lbs. (204st. 6 lbs.) Her food in the same time as above was 325 cakes, 3192 lbs. of turnips, and 546 lbs. of hay.

The black Scottish ox weighed at Woburn, 10cwt. 2 qrs. 14 lbs. (148 st. 6 lbs.) Fed on grass, turnips, and hay, from May to the 5th of December, 1804.

* Annals, vol. xli.

Increase of Weight in the Duke of Bedford's Cattle.

Kinds of Cattle.	Live Weight, Jan. 6, 1804.			May 2.			August 14.			December 1.			Total Gain.			Stones of 8 lb. gained.	
	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.	st.	lb.
Devon ox, -	13	1	7	11	3	0	15	3	6	17	3	9	4	2	0	63	0
Devon ox, -	16	0	10	17	3	0	18	2	14	20	3	14	4	3	4	67	0
Glamorgan ox,	12	0	24	13	3	0	14	1	14	16	0	14	3	3	18	54	6

Weights of Five six-year old Oxen.		Weight, May 12, 1805.		Oct. 3.		Feb. 24, 1806.		Total Gain.		Ditto in Stones of 8lb.	
		cwt.	qrs.	cwt.	qrs.	cwt.	qrs.	cwt.	qr.	st.	lb.
Devon oxen,	1.	14	0	19	0	20	1	6	1	87	4
	2.	11	0	15	2	16	2	5	2	77	0
Lord Somers- ville's Show, &	3.	10	2	14	0	16	0	5	2	77	0
	4.	12	0	15	2	17	0	5	0	70	0
	5.	10	2	14	0	15	2	5	0	70	0

Worked Oxen.—There is scarcely a farmer who is an advocate for the use of oxen in the county. They are kept by a few of the principal proprietors, and some have tried them and discontinued their use. Mr. Wilson, the Duke of Bedford's bailiff at Woburn, thinks the arguments against their use are of much weight. Mr. Runciman observes, he has neither fences nor sward fit for oxen; and from other quarters it is objected, that they are not fit for dirty work, nor hilly ground, nor hard roads, as their shoes are continually coming off.

*Account of the Quantities of Hay ate in Six Days
by Six Oxen, regular working*.*

	<i>Hay given.</i>	<i>Taken back.</i>
Two Hereford oxen,	568 lbs.	176 lbs.
Two Devonshire oxen,	606	117
Two Herefordshire oxen,	603	153

The average amounts to 345 lbs. per week for each ox ; which at 3s. per cwt. would amount to 24*l.* per annum.

The late Duke of Bedford wished to put to the test of *experiment*, those doubtful subjects which never can be ascertained in any other way.

It will be observed, that six days keeping is insufficient to shew the annual expense of feeding working oxen, yet it may serve to point out the means to others.

“ Go thou and do likewise.”

Mr. Platt, of Lidlington, observes that oxen may be worked for two years, viz. from three to five years old ; but they should not work so hard as to become poor and lean.

SECT. II.—SHEEP.

“ It is impossible to give a description of any particular sort as the breed of the county ; because jobbers are constantly driving various sorts from fair to fair, and selling them in the different counties. .

“ The horned and polled are mixed together ; and as a pretty general description of them, I may venture to observe, that they are coarse in their heads and necks, proportionably large in their bones, high on the leg, narrow in their bosoms, shoulders, chins, and

* Annals, vol. xxix.

quarters,

quarters, and light in their thighs; and their wool is generally of a very indifferent quality, weighing from 3 lbs. to 4 lbs. per fleece. A few exceptions may be made to this description, in the sheep at Goldington, St. Leonard's, Ickwell, and a few other places; but generally speaking, upwards of nine-tenths of the sheep of the common fields of the county, are of this description.

“ *The sheep bred upon the enclosures* are generally of a much superior quality; being for the most part a mixture between the Lincolnshire and Leicestershire sorts; but they are not equal to the most perfect of either kinds, though very useful and profitable.”

In the only copy of Mr. Stone's original Report which was returned from Bedfordshire, are the following observations by Edward Rudd, Esq. of Biggleswade.

“ Upon wet, cold clay lands, where sheep are driven a great way to fold, in common fields, the horned sheep, that are short legged, and well made, are the most beneficial to be kept; but on dry land, or pasture ground, the better sort of polled sheep, where they are not driven far to fold, are the most profitable. Good sheep of the above description, of either sort, if kept sound, are the most advantageous of any cattle to the farmer.”

Since the above was written (1794), the prevalence of the enclosing system, and the influence and example of the late Duke of Bedford, have contributed materially to improve the sheep stock of the county. The New Leicester breed has been introduced into many parishes, and various crosses of this breed with the Wiltshires, and other kinds, have found their way even into the open fields.

There are, however, a great many farmers, who
 BEDS.] N D granting

granting the superior merit of the Dishley sheep, are yet found to maintain that this, like many other improvements, costs as much, and sometimes more than it is worth; and that some years must elapse ere the profit overbalances the previous expenses of tups, &c. Hence it may be observed, that there are other reasons, in addition to prejudice of education, &c. that prevent a hasty adoption of new practices.

The horned sheep which remain in the county, occupy many of the towns which are yet unenclosed; as in the angle of the county from Leighton to Whipsnade, and many other places.

Experiment on the Comparison of Four Breeds of Sheep, made by Order of, and communicated by, the late Duke of Bedford.*

The experiment here detailed, is a repetition of a former one that was not deemed conclusive.

“ In order to attain a more accurate result, twenty South Downs bred on the farm at Woburn, from sheep procured on the South Downs, were selected, and the same number of New Leicesters from Leicestershire, of Worcestershire sheep from that county, and of Wiltshires, from their county—were bought; attention being paid to procuring good stock of the same age of their respective sorts.

“ At this beginning of the trial, the Leicesters were fat; the South Downs in good condition; and the Wiltshires and Worcesters lean.

“ And in order to render the food eaten, as well in summer as in winter, a part of the trial, sixteen acres in

* *Annals*, vol. xxvi.

the park were hurdled into four divisions; the soil, herbage, &c. as equal as could be chosen. The experiment began 19th of November, 1794, when twenty of each sort were put into four acres; and continued there till killed, except for nineteen days, when the several pastures seeming rather too bare, the sheep were drawn off, to refresh the food during that time.

The following are the Weights of Eighty Lambs, November 19, 1794, after fasting Eighteen Hours.

	South Down.		Leicestershire.		Worcestershire.		Wiltshire.	
No. 1.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
2.	98	8	97	0	97	0	113	0
3.	92	0	106	8	87	8	95	0
4.	89	8	101	0	87	8	113	8
5.	93	0	95	8	90	0	102	8
6.	93	0	89	8	88	0	125	0
7.	102	0	97	0	94	0	133	8
8.	94	0	92	8	100	0	112	0
9.	99	0	98	8	85	8	108	0
10.	103	8	102	8	91	8	97	0
11.	99	0	100	8	89	8	105	0
12.	99	0	109	8	90	8	102	0
13.	97	0	80	8	94	0	107	8
14.	98	0	93	0	91	8	109	8
15.	91	0	99	0	95	8	104	0
16.	94	0	88	8	91	0	100	8
17.	92	8	105	0	93	8	105	8
18.	101	8	98	0	104	8	110	8
19.	101	8	87	0	85	8	98	0
20.	95	0	104	8	95	0	108	8
21.	100	8	109	0	104	0	113	0
	1933	8	1954	0	1855	8	2163	8
Aver.	96	0	97	0	92	0	108	0

“They were put to turnips, which were strewed on the grass of each division till February 24, when, on being weighed again, the following was the result.

Seventy-six Sheep, weighed 25th February, 1795.

No.	South Down.		Leicester.		Worcester.		Wiltshire.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
1.	88	3	83	4	77	12	99	0
2.	80	12	88	2	78	0	86	0
3.	71	8	89	4	81	8	94	0
4.	79	10	85	4	89	8	80	0
5.	84	0	78	4	87	0	101	8
6.	97	8	88	0	91	12	122	0
7.	94	6	82	10	87	0	87	0
8.	91	8	86	0	75	8	93	8
9.	94	12	92	4	74	10	88	0
10.	89	12	85	0	82	8	101	4
11.	93	6	97	12	85	8	91	0
12.	92	14	67	4	82	12	102	4
13.	86	0	77	4	69	0	95	8
14.	77	4	82	0	78	0	90	6
15.	90	8	72	8	83	0	87	12
16.	80	10	86	12	74	12	89	4
17.	83	0	82	0	91	8		
18.	89	0	73	12	76	8		
19.	83	8	90	12	86	10		
20.	91	12	97	0	81	1		
	1739	3	1685	0	1654	0	1508	6

“The reason why only 16 Wiltshires were now weighed was, its being observed that they ate in the proportion of 16, equalling in consumption of the turnips, 20 of the others; it was therefore thought unnecessary keep more.

“The consumption of turnips between December 4, 1794, and February 24, 1795, was as follows :

South Downs,	10,945 lbs.
Leicesters,	11,500
Worcesters,	11,498
Wiltshires,	11,518

All the four lots 120 lbs. of hay each.

Tcgs.

Tegs.	Weight, Nov. 19.		Weight, Feb. 25.		Loss of Weight.		Loss per Head, alive,		Average died, as 20 to 12.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
20 South Downs,	1933	8	1739	3	194	5	9	11	5	13
20 Leicesters,	1934	0	1685	0	269	0	13	8	3	1
20 Worcesters,	1855	8	1654	0	201	8	10	1	6	0
16 Wiltshire (to) No. 16), }	1733	8	1508	6	225	2	14	1	8	9
Average loss in) 14 weeks, }	—		—		—		—		7	1

“ It is to be observed in this experiment, as well as in that above quoted (*Annals*, vol. xxiii.), that the loss of weight by feeding (*tegs or pugs*) on turnips, is remarkable: in this trial it is considerable; yet to draw that root, and spread them on a grass-field, is supposed to be the most beneficial method of consuming the crop, relative to the stock that eats it.

“ The loss at 5*d.* per pound, amounts to above 2*d.* per week for the time they were at turnips. Throughout this experiment, mutton is reckoned at 5*d.* per pound. It is a matter of perfect indifference what the price is, provided it be the same for all, as the comparison of the breeds is the principal object. The real price, owing to the scarcity, was when sold, much higher; but as 5*d.* per pound is much more common, and perhaps above the average of the kingdom for years together, the trial will be more generally useful, by supposing a price nearer a general one, than the particular ratio of the moment.

“ On an average of crops, drawn and given on the grass in the manner these were, 3*d.* or 4*d.* per week would be given; to which add 2*d.* and a fraction loss, and the account shews what sort of a food turnips often prove in sheep feeding.

" From this time they were turned to turnips, &c. with the store stock, and April 9th to pasture; the paddocks not being forward enough to receive them till May 13, when they were weighed again.

Seventy-six Sheep; weighed 13th of May, 1795.

	South Downs.		Leicesters.		Worcesters.		Wiltshires.	
No. 1.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
2.	83	0	71	0	86	12	105	0
3.	82	8	86	4	85	4	96	12
4.	87	6	88	4	97	4	97	0
5.	86	8	80	12	95	12	99	0
6.	103	12	86	8	90	0	92	0
7.	96	12	85	12	97	8	132	4
8.	101	12	81	12	94	4	106	0
9.	101	0	86	12	82	14	109	0
10.	90	4	88	0	89	8	107	8
11.	98	8	95	12	92	8	103	0
12.	101	0	80	0	87	0	100	2
13.	92	4	83	8	98	10	96	8
14.	83	4	84	8	93	6	96	10
15.	87	4	77	8	86	0	110	8
16.	91	6	91	6	76	12	132	0
17.	89	2	84	0	107	12		
18.	96	0	99	0	80	8		
19.	92	12	81	0	96	12		
20.	104	4	97	8	102	8		
	1862	14	1711	2	1827	8	1690	12

Tegs or Pugs.	Weight, Feb. 25.		Weight, May 13.		Gain in Weight.		Gain per Head alive.	
	lb.	lb.	lb.	oz.	lb.	oz.	lb.	oz.
20 South Downs,	1739	3	1862	14	123	11	6	3
20 Leicesters,	1685	0	1711	2	26	2	1	5
20 Worcesters,	1654	0	1827	8	173	8	8	10
16 Wiltshires.	1508	6	1690	12	182	6	11	6

" At this first putting to grass, therefore, the Leicesters did the worst, and the Wiltshires the best.

" The

"The total gain is per head, $6\frac{1}{2}$ lb. or dead weight, $3\frac{1}{2}$ lb., and at $5d.$ per pound, is $5\frac{1}{2}d.$, which for six weeks and a half, is per week nearly $2\frac{1}{2}d.$ Reduced therefore as they were by turnips, they gained more per week by the grass, than they had lost per week on that root. Yet the gain is apparently smaller than might be expected, though much depends on the state of the weather, of which no account is given.

"July the 3d, they were weighed again.

Seventy-six Sheep, and their Wool, weighed the 3d July, 1795, after being shorn.

	South Downs.		Leicesters.		Worcesters.		Wiltshires.	
	Sheep.		Sheep.		Sheep.		Sheep.	
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
No. 1.	108 4	4 11	91 0	7 1	104 12	6 9	126 8	4 12
2.	101 0	4 10	85 0	4 0	96 4	6 0	119 8	5 2
3.	89 8	4 10	96 0	7 8	86 12	6 10	120 4	3 15
4.	99 0	3 12	91 0	5 14	111 12	7 0	113 8	4 15
5.	105 4	4 10	97 4	5 8	119 0	8 1	117 6	5 0
6.	115 0	5 6	96 0	7 4	111 2	6 14	106 10	4 6
7.	104 12	5 11	98 4	6 7	112 12	6 2	146 4	5 1
8.	110 12	6 6	96 0	6 4	107 12	6 12	121 8	5 2
9.	113 10	5 0	101 6	6 8	97 2	6 8	115 10	5 0
10.	105 4	5 8	100 6	7 7	101 0	6 0	122 8	6 10
11.	115 4	4 12	119 2	6 7	103 6	6 13	120 0	4 0
12.	114 0	4 9	90 8	6 6	97 12	6 13	118 0	5 15
13.	101 4	5 1	91 0	5 2	98 2	8 8	113 4	5 14
14.	95 0	4 8	95 0	7 0	106 0	6 6	113 12	5 3
15.	96 8	6 0	84 0	6 4	115 0	6 7	129 0	5 6
16.	108 8	3 15	98 6	7 4	98 10	6 0	151 0	5 12
17.	106 10	4 0	94 8	7 11	116 0	9 5		
18.	107 8	4 4	105 2	6 4	95 12	4 15		
19.	102 0	4 10	90 10	7 10	105 0	8 0		
20.	119 0	3 4	114 12	7 6	110 0	8 2		
2118 0		94 13	1834 4	131 3	2083 14	137 8	1954 10	82 1

	Weight, May 13.		Weight with their Wool, July 3.		Gain in Weight.	
	lb.	oz.	lb.	oz.	lb.	oz.
20 South Downs,	1862	14	2212	13	349	15
20 Leicesters,	1711	2	2065	7	354	5
20 Worcesters,	1827	8	2221	6	393	14
16 Wiltshires,	1690	12	2036	11	345	15

"October 15, the summer food finished, and turnips began to be given. They were weighed again.

Seventy-six Sheep, weighed 15th October, 1795, and put to Turnips.

No.	South Downs.		Leicesters.		Worcesters.		Wiltshires.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
1.	135	0	120	2	128	8	153	0
2.	120	0	106	0	183	0	148	8
3.	110	0	122	8	118	0	145	8
4.	119	12	127	0	144	0	141	0
5.	128	4	126	8	137	8	116	0
6.	134	0	122	10	145	0	130	8
7.	129	0	129	8	143	0	172	0
8.	130	4	118	8	143	4	157	0
9.	137	0	133	0	127	12	143	8
10.	128	8	128	0	133	0	153	0
11.	137	4	141	12	128	8	147	0
12.	138	4	118	0	124	0	149	12
13.	125	8	118	12	127	8	147	0
14.	118	4	127	8	139	0	141	8
15.	122	0	110	4	150	0	160	0
16.	120	0	124	4	123	4	180	0
17.	133	0	131	8	153	0		
18.	135	8	135	8	132	0		
19.	122	0	117	8	158	0		
20.	140	2	146	8	149	8		
	2572	10	2505	4	2717	12	2418	4

		Weight, July 3.		Weight, Oct. 15.		Gain.	
		lb.	oz.	lb.	oz.	lb.	oz.
20	South Downs,	2212	13	2572	10	359	13
20	Leicesters,	2065	7	2502	4	439	13
20	Worcesters,	2221	6	2717	12	496	6
16	Wiltshire s.	2036	11	2418	4	381	0

"The Worcesters through the summer, therefore, did very well.

"The following statement will shew the gain on grass, from leaving off turnips in the spring, to putting again to turnips in the autumn.

20 South-

	Increase of Weight, from Feb. 25, to Oct. 15, 33 Weeks.		Dead Weight, supposing 90 gives 12.		Value of Meat gained per Head at 5d. per Pound		Gain per Week.	Ditto at the present Price, 7½d. (1807.)
	lb.	oz.	lb.	oz.	s.	d.	d.	d.
20 South Downs, -	833	7	499	0	10	4½	3	5½
20 Leicesters, -	820	4	492	0	10	3	2½	5½
20 Worcesters, -	1063	12	637	0	13	4	4	7½
10 Wiltshires, -	600	14	544	0	11	2	2	7½

"The superiority of the Wiltshires, which seems to be indicated by this experiment, should be regulated by a reference to the relative quantity of food consumed by each, which is as sixteen is to twenty, or as four is to five. But if one-fourth be added to the gain of the Leicesters, a balance remains in favour of the Wiltshires, of 1s. 4½d. in the 33 weeks.

"Being put to turnips a second time, they continued to be so fed till Feb. 16, 1796, when they were sent to market, being first weighed.

Seventy-six Sheep, weighed 16th February, 1796, and sent to Market.

	South Downs.		Leicesters.		Worcesters.		Wiltshires.	
No. 1.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
2.	132	0	136	8	137	8	170	0
3.	124	0	112	4	137	0	156	8
4.	121	0	131	8	118	8	147	12
5.	133	0	146	12	147	0	148	0
6.	144	0	131	0	145	0	156	0
7.	144	0	128	8	164	0	149	0
8.	144	8	143	8	148	0	176	0
9.	132	6	132	8	151	0	175	0
10.	143	12	143	4	120	4	148	0
11.	134	0	140	4	142	2	162	8
12.	141	2	148	4	140	8	158	2
13.	155	8	133	0	125	0	158	0
14.	131	0	144	8	133	0	154	0
15.	125	0	134	0	145	0	152	0
16.	127	8	145	0	166	4	172	0
17.	134	0	131	0	132	8	189	0
18.	140	0	151	12	159	0		
19.	141	0	157	0	136	0		
20.	132	0	126	12	155	0		
	155	0	152	0	161	0		
	2734	12	2760	4	2863	10	2571	14

	Increase of Weight from October 15, to February 16, eighteen Weeks.		Dead Weight, supposing 20 gives 12.	Value of Meat gained per Head at 5d. per Pound.		Gain per Week.	Ditto at the present price of 7½d. (1807).
	lb.	oz.	lb.	s.	d.	d.	d.
20 South Downs, -	162	2	97	2	0½	1½	2
20 Leicesters, -	264	0	158	3	3½	2½	3½
20 Worcesters, -	145	14	86	1	9½	1	1½
16 Wiltshires, -	153	10	91	2	4½	1½	2½

“In respect to all the calculations per week of what was paid by the sheep, it is stated only for the sake of comparison; there is an additional return by lean flesh, at a lean price, being converted into a saleable price, which adds considerably; but this equal to all, in proportion to their weight.

“In regard to the consumption of turnips, they were weighed from Oct. 19, 1795, to Feb. 14, 1796, as they were given to the sheep, and the remnants not eaten, also weighed and deducted. The following is the result.

Sheep Food, 18 Weeks.	Twenty South Downs.	Twenty Leicesters.	Twenty Worcesters.	Sixteen Wiltshires.
	lb.	lb.	lb.	lb.
Turnips given, - -	54,036	54,036	54,036	54,036
Taken away, - -	1812	2001	1361	1189
Eaten, - - -	52,224	52,035	52,675	52,847
Hay given, - - -	64	54	68	76
Turnips per week, - -	3072	3061	3093	3108
Hay per week, - -	4	3	4	5
A good acre of turnips supposed to weigh 14 tons, or 31,360 lbs. will keep 20 sheep, with the hay as above, }	10	10	10	8
	1	1	1	0

“There is still another comparison to make, and that is, their increase from the first to the last, including in one account the turnips of both winters, and the grass.

A General

	Weight, No- vember 19, 1794.	Weight, Feb. 25, 1795, and Loss in 14 Weeks at Tur- nips.	Weight, May 13, 1795, and Increase in 1 Weeks at Tur- nips & Grass.	Weight with their Wool, July 3, 1795, & Increase in 8 even Weeks at Grass.	Weight, Oct. 15, 1795, and Increase in 1 Weeks (Wool omitted) at Grass.	Weight, Feb. 16, 1796, and Increase in 14 Weeks at Tur- nips.	Increase in the last 51 Weeks —One Year's Wool.—Value of Flesh, at 7½¢ per lb. and the Wool	Sold at about two years old Price of Flesh and one Year Wool.
Twenty South Downs, Average weight alive, Ditto dead (as 20 is to 12),	1935lb. 8oz. 96 10 58 0	1739lb. 3oz. 87 0 52 3	1862lb. 14oz. 93 2 55 14	2212lb. 13oz. 110 10 66 6	2572lb. 10oz. 128 10 77 3	2734lb. 12oz. 136 13 82 1	£.0 18 8½ 0 6 2½	£.2 7 0 0 6 2½
Ditto in stones of 8 lb. Loss and gain (dead weight), Wool 37½ per tod of 28 lb.	7st. 2lb. 6oz. —	6st. 4lb. 3oz. 5 13	6st. 7lb. 14oz. 0 3 11	6st. 8lb. 6oz. 1 2 8	6st. 5lb. 3oz. 1 2 13	6st. 2lb. 1oz. 0 4 14	£.1 4 11½ Per week, 5½	£.2 13 2½
Twenty Leicester, Average weight alive, Ditto dead (as 20 is to 12),	1954lb. 6oz. 97 11 58 10	1685lb. 6oz. 84 4 50 9	1711lb. 5oz. 85 9 51 5	2065lb. 7oz. 103 4 61 15	2250lb. 4oz. 125 4 75 2	2769lb. 4oz. 138 7 83 1	£.1 0 3½ 0 4 8	£.2 10 8 0 4 8
Ditto in stones of 8 lb. Loss and gain (dead weight), Wool 50½ per tod.	7st. 2lb. 10oz. —	6st. 2lb. 9oz. 1 0 1	6st. 8lb. 5oz. 0 0 12	7st. 4lb. 15oz. 1 2 10	9st. 8lb. 2oz. 1 5 3	10st. 5lb. 1oz. 0 7 15	£.1 4 11½ Per week, 5½	£.2 15 4
Twenty Woresters, Average weight alive, Ditto dead (as 20 is to 12),	1855lb. 8oz. 92 12 55 10	1654lb. 6oz. 82 11 49 10	1827lb. 8oz. 91 6 54 13	2221lb. 6oz. 111 1 66 10	2417lb. 12oz. 135 14 81 8	2863lb. 10oz. 143 3 85 13	£.1 2 7½ 0 5 1½	£.2 4 9½ 0 5 1½
Ditto in stones of 8 lb. Loss and gain (dead weight), Wool 21½ per tod.	6st. 7lb. 10oz. —	6st. 1lb. 10oz. 0 6 0	6st. 6lb. 13oz. 0 5 3	8st. 2lb. 10oz. 1 3 13	10st. 1lb. 8oz. 1 6 14	10st. 5lb. 13oz. 0 4 5	£.1 7 9 Per week, 6½	£.2 9 11
Sixteen W thires, Average weight alive, Ditto dead (as 20 is to 12),	1733lb. 8oz. 108 5 65 0	1508lb. 6oz. 94 4 56 9	1650lb. 12oz. 105 10 63 5	2036lb. 11lb. 127 5 76 6	2418lb. 4oz. 151 2 90 11	2571lb. 14oz. 160 12 96 7	£.1 4 11½ 0 5 5½	£.2 6 4½ 0 5 5½
Ditto in stones of 8 lb. Loss and gain (dead weight), Wool 30½ per tod.	8st. 1lb. 6oz. —	7st. 0lb. 9oz. 1 0 6	7st. 7lb. 5oz. 0 6 11	9st. 4lb. 6oz. 1 5 1	11st. 2lb. 11oz. 1 6 5	12st. 0lb. 7oz. 0 5 12	£.1 10 5 Per week, 7	£.2 11 10½

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"The experiment was terminated by the sheep being driven to Smithfield; but in order to render it yet more satisfactory, one from each lot was chosen; the second best as nearly as could be, in order for killing and weighing more particularly; and that the question of bone might not depend on any general assertions, they were ordered to be carefully kept, and weighed from every joint as eaten. The following is the result.

*The Weight of Four of the Experimental Sheep,
killed March 14, 1796.*

	South Down Sheep, No. 20.		Leicester Sheep, No. 20.		Worcester Sheep, No. 20.		Wiltshire Sheep, No. 3.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
Weighed alive, -	155	0	152	0	161	0	175	0
Skin, - - -	17	8	20	0	23	0	23	0
Fat, - - -	13	2	11	8	12	8	13	8
Head and pluck, -	10	8	9	6	12	0	14	0
Entrails, - -	13	4	11	2	15	0	17	10
Blood, - - -	5	14	6	0	8	0	8	2
Four quarters, -	92	6	92	0	89	0	97	0
	152	10	150	0	159	8	173	4
Waste, viz. urine } & evaporation, }	2	6	2	0	1	8	1	12
Bones, clean, -	6	5½	5	9	6	0	9	8
Fat, with the } kidnies in, - }	8	6	5	1	6	12	4	3½
Kidnies, - - -	0	4½	0	4	0	5	0	5
Proportion of live } & dead weight, }	20 gives 11½		20 gives 12		20 gives 11		20 gives 11	

"From this experiment it appears, a New Leicester which weighs about eleven stone and a half, carries as much flesh when freed from the bones, as a Wiltshire of twelve stone; consequently, if the Leicester mutton is

is worth $7\frac{1}{4}d.$ per pound, the Wiltshire mutton will be worth no more than $7\frac{1}{4}d.$ so far as quantity is concerned."

The following accounts of experiments on sheep by the late Duke of Bedford, are extracted from vol. xxxix. of Mr. Young's *Annals*.

"The objects which attracted the agricultural attention of this most lamented Nobleman, and excellent farmer, had all a certain degree of national importance annexed to them. Of these, none were more steadily pursued, than His Grace's inquiries into the comparative merit of the principal breeds of sheep known in this kingdom; and the means he took to ascertain experimentally their value, were always wisely planned: for the sheep, the subjects of the trial now to be noted, he applied to the most celebrated breeders; and in order that the trial might be the fairer, they were all lambed at Woburn: he procured ewes tugged at home, and the lambs they produced were to be the individuals for comparison. No orders could be given more precisely than those of His Grace, that the minutest attention should be paid in the course of the trial, to doing exact justice to all the breeds.

An Account of the different Breeds of Lambs weighed alive, July 8, 1799, and October 28, 1799.

Gloucester Lambs.

	<i>First Weight.</i> <i>July 8.</i>	<i>Second Weight.</i> <i>Oct. 28.</i>	<i>Gain.</i>
	<i>lb.</i>	<i>lb.</i>	<i>lb.</i>
No. 1. Wether,	78	91	13
2. Wether,	66	86	19
3. Ewe,	89	96	16
4. Ewe,	78	91	13
			No. 5.

No.		First Weight.	Second Weight.	Gain.
		July 8.	Oct. 28.	
		lb.	lb.	lb.
No. 5.	Ewe,	66	88	22
6.	Wether,	87½	104	16½
7.	Wether,	80½	99	18½
<i>Durham Lambs.</i>				
8.	Wether,	94	115	21
9.	Ewe,	79	101	29
10.	Wether,	93	—	Died.
11.	Wether,	75½	89	13½
12.	Ewe,	79	97	18
13.	Wether,	85	96	11
<i>Romney Marsh.</i>				
14.	Wether,	74	95	21
15.	Ewe,	74½	87	12½
16.	Ewe,	74½	95	20½
17.	Ewe,	69	88	19
18.	Wether,	76½	103	26½
19.	Wether,	70½	93	22½
20.	Ewe,	64	87	23
21.	Wether,	70½	87	16½
22.	Ewe,	65	77	12
<i>Lincoln.</i>				
23.	Ewe,	62	78	16
24.	Ewe,	78	89	11
25.	Wether,	60	81	21
26.	Ewe,	80	88	8
27.	Ewe,	69	74	5
<i>Leicester.</i>				
28.	Wether,	65½	87	21½
29.	Ewe,	67½	82	14½
30.	Wether,	64	84	20
31.	Wether,	63	83	20

Berkshire.

Berkshire.

No.		First Weight, July 8.	Second Weight, Oct. 28.	Gain.
		lb.	lb.	lb.
32.	Ewe,	84	105	21
33.	Wether,	75	91	16
34.	Wether,	106	126	20
35.	Ewe,	45	73	28
36.	Wether,	73½	94	20½
37.	Wether,	95	117	22

Wiltshire.

38.	Wether,	79	100	20
39.	Wether,	104½	112	7½
40.	Ewe,	90	111	21
41.	Wether,	93½	—	Died.
42.	Wether,	87½	113	26

Dorsetshire.

43.	Wether,	71	94	23
44.	Wether,	71	88	14
45.	Wether,	92	113	21
46.	Wether,	91	104	13
47.	Wether,	70	93	23
48.	Wether,	76	93	17
49.	Ewe,	69	86	17

Rylands.

50.	Wether,	70	75	5
51.	Wether,	59	68	9
52.	Ewe,	53	68	15
53.	Ewe,	53	63	10
54.	Ewe,	49½	61	11½
55.	Wether,	53	72	19
56.	Wether,	56	68	12
57.	Ewe,	55	67	12
58.	Wether,	54	65	11

No. 59.

	<i>First Weight.</i> <i>July 8.</i>	<i>Second Weight.</i> <i>Oct. 28.</i>	<i>Gain.</i>
	<i>lb.</i>	<i>lb.</i>	<i>lb.</i>
No. 59. Wether,	47½	63	15½
60. Wether,	53	74	21

South Down.

61. Ewe,	63	76	13
62. Ewe,	56	71	15
63. Ewe,	65	84	19
64. Wether,	56	75	19
65. Wether,	73½	87	13½
66. Wether,	75	97	22

Romney Marsh.

67. Wether,	60	90	30
68. Wether,	86	100	14

Weighed to and from One Acre and an Half of Grass, for trying which would bear Hard Usage best.

No.	Breeds.	June 2d.	Oct. 23d.	Gain.	Loss.
		<i>lb.</i>	<i>lb.</i>	<i>lb.</i>	<i>lb.</i>
1.	Gloucestershire wether, - -	170½	178	2½	—
2.	Ditto ditto, - - -	157½	188½	31	—
25.	Lincolnshire wether, - -	125	140	15	—
26.	Ditto ewe, - - -	119	122½	3½	—
8.	Durham wether, - - -	210½	—	—	—
13.	Ditto ditto, - - -	160½	182½	22	—
33.	Berkshire ewe, - - -	125½	134½	9	—
34.	Ditto wether, - - -	185½	183½	—	2
30.	Leicester wether, - - -	140	151	11	—
31.	Ditto ditto, - - -	132	140½	8½	—
18.	Romney-marsh wether, - -	166	178	12	—
19.	Ditto ewe, - - -	137½	143½	6	—
	South Down wether, - -	129	128	—	1
64.	Ditto ewe, - - -	115	128	13	—
38.	Wiltshire wether, - - -	178½	177	—	1
42.	Ditto ditto, - - -	180	181	1	—
43.	Dorsetshire wether, - -	149	154½	5½	—
44.	Ditto ditto, - - -	171	179½	8½	—
55.	Ryland wether, - - -	117	117	—	—
58.	Ditto ewe, - - -	96	97½	—	—

Weights

Weights at taking to the House, and at Slaughtering.

No.	October 23d.		Dec. 4th.		Gain.	
	lb.	oz.	lb.	oz.	lb.	oz.
1.	173	0	194	3	21	3
2.	188	8	210	12	22	4
25.	140	0	165	4	25	4
26.	122	8	155	2	32	10
13.	182	8	200	0	17	8
33.	134	8	139	1	4	9
34.	183	8	215	3	31	11
30.	151	0	168	10	17	10
31.	140	8	151	11	11	3
18.	178	0	197	6	19	6
19.	143	8	153	2	14	10
	128	0	139	0	11	0
64.	128	0	135	11	7	11
38.	177	0	196	14	19	14
42.	181	0	196	0	15	0
43.	154	8	170	0	15	8
44.	179	8	197	4	7	13
55.	117	0	129	9	12	9
58.	97	8	103	7	5	15

Consumption of Food, Flesh gained, and at what Rate of Food for every Pound of Flesh.

	Total of Food.		Flesh gained.	1 lb. of Flesh.	
	Turn- nips.	Corn.		Turn- nips.	Corn.
	lb.	lb.	lb.	lb. oz.	lb. oz.
Gloucesters, - - -	923	277½	43	21 7	6 7
Lincolns, - - -	806	229½	57	14 2	4 0
Durhams, - - -	484	130½	17	23 2	7 10
Berks, - - -	738	231½	36	20 8	6 3
Leicesters, - - -	570½	199	28	20 5	7 1
Romney-marsh, - - -	558	198½	34	16 3	5 12
South Downs, - - -	419½	141½	18	23 4	7 13
Wiltshires, - - -	755	260½	34	21 2	7 10
Dorsets, - - -	583½	213	23	25 5	9 4
Richands, - - -	459	154½	18	25 8	8 8

Weight

Weight of Wool.

	<i>Breeds.</i>	<i>June 2, 1801.</i>	
		<i>Fleeces.</i>	
		<i>lb.</i>	<i>oz.</i>
No. 1.	Gloucester wether,	11	12
2.	Ditto ditto,	11	8
25.	Lincolnshire wether,	10	4
26.	Ditto ewe,	11	8
8.	Durham wether,	11	0
13.	Ditto ditto,	7	4
3.	Berkshire ewe,	3	0
4.	Ditto wether,	6	4
30.	Leicestershire wether,	5	4
31.	Ditto ditto,	6	12
18.	Romney Marsh wether,	7	12
19.	Ditto ewe,	5	0
	South Down wether,	2	12
64.	Ditto ewe,	4	4
38.	Wiltshire wether,	5	4
42.	Ditto ditto,	5	12
43.	Dorsetshire wether,	4	4
44.	Ditto ditto,	4	12
55.	Ryland wether,	4	8
58.	Ditto ewe,	5	0

Another account of the weight of wool from five different breeds of sheep, though not belonging to this experiment, may be here inserted.

	<i>lb. of Wool.</i>	<i>Average.</i>
		<i>lb.</i> <i>oz.</i>
6 Cotswold ewes, clipt,	44	7 5
12 Gloucester ewes,	87	7 4
9 Romney Marsh ewes,	51	5 10
8 Durham ewes,	74	9 4
8 Lincolnshire ewes,	74	9 4
7 Spanish ewes,	33	4 11

BREDs.]

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The Weight of the various Parts of the Experimental Sheep, killed December 8, 1801.

	Carcass.		Skin.		Head & Pluck.		Blood.		Loose Fat.		Entrails.	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
No. 1.	108	0	24	4	11	15	8	1	10	4	20	2
2.	115	8	28	6	14	7	8	9	11	4	20	9
25.	88	0	23	5	10	3	7	2	6	3	20	12
26.	83	0	20	14	9	14	7	2	5	12	15	14
8.	—	—	—	—	—	—	—	—	—	—	—	—
13.	114	4	21	0	13	4	8	3	12	2	19	3
33.	75	12	13	12	9	12	7	3	10	6	16	6
34.	122	0	21	9	13	5	9	5	15	8	21	8
30.	98	0	17	5	9	8	5	9	13	8	14	2
31.	89	12	18	5	9	2	4	4	9	6	12	8
18.	110	0	20	11	11	14	7	4	17	2	17	3
19.	94	4	13	5	9	7	6	7	12	2	15	2
S.D. w.	79	0	11	1	9	0	4	14	12	0	13	8
64.	78	12	15	4	7	11	5	5	9	13	13	7
38.	112	0	17	14	12	8	7	14	16	2	20	10
42.	109	4	23	3	12	3	8	2	11	1	24	2
43.	98	0	15	13	11	3	6	7	11	12	15	9
44.	111	8	16	6	10	14	6	1	15	4	17	3
55.	73	12	11	14	8	1	5	4	11	3	11	4
58.	56	0	14	12	7	1	4	5	8	13	7	13

The Proportion between the Live and Dead Weight, supposing the Live Weight to be Twenty Pounds.

No.	Live Weight.		Carcass, or Dead Weight.		Proportion to 20.
	lb.	oz.	lb.	oz.	
1. Gloucester wether,	182	10	108	0	11 $\frac{1}{2}$
2. Ditto wether	198	11	115	8	11 $\frac{1}{2}$
25. Lincoln wether,	155	9	88	0	11 $\frac{1}{2}$
26. Ditto ewe,	142	8	83	0	11 $\frac{1}{2}$
8. Durham wether,	—	—	—	—	—
13. Ditto wether,	183	0	114	4	12
33. Berkshire ewe,	138	3	75	12	10 $\frac{1}{2}$
34. Ditto wether,	202	11	122	0	12
30. Leicester wether,	158	0	98	0	12 $\frac{1}{2}$
31. Ditto wether,	143	5	89	12	12 $\frac{1}{2}$
18. Romney Marsh wether,	184	0	110	6	11 $\frac{1}{2}$
19. Ditto ewe,	151	11	94	4	12 $\frac{1}{2}$
South Down wether,	129	7	79	0	12 $\frac{1}{2}$
64. South Down ewe,	130	4	78	12	12
38. Wiltshire wether,	187	0	112	0	11 $\frac{1}{2}$
42. Ditto wether,	187	15	109	4	11 $\frac{1}{2}$
43. Dorsetshire wether,	158	12	98	0	12 $\frac{1}{2}$
44. Ditto wether,	177	4	111	8	12 $\frac{1}{2}$
55. Ryland wether,	121	6	73	12	12
58. Ditto ewe,	98	14	56	0	11 $\frac{1}{2}$

" His Grace the Duke of Bedford fattened two New Leicester wethers, which were procured from that county in 1796, the live and dead weight of which are as follows :

	<i>Live Weight.</i>	<i>Carcase.</i>	<i>20 lb. given</i>
No. 1. ..	250 lbs. 4 oz.	169 lbs.	13
2. ..	244 0 	165 	13

" No. 1. was killed at Bath, and gained the Bath Society's first prize: they were sold for ten guineas each.

" *Experiment on Two Sheep, weighed April 28, 1796, in the Wool.*

	<i>April 28.</i>	<i>Wool, June 3.</i>
No. 1. New Leicester,	106 lbs.	7 lbs. 4 oz.
2. South Down,	113 	5 2

" The food, grass, and tares, weighed regularly from May 30.

	<i>May 30.</i>	<i>Sept. 7.</i>	<i>Increase.</i>	<i>Ditto with the Wool.</i>	<i>Dead Weight.</i>
New Leicester,	121 lbs.	138 lbs.	17 lbs.	24 lbs. 4 oz.	14 lbs. 11 oz.
South Down,	124	139	15	20 2	12 1

" Value of meat gained at $7\frac{1}{4}d.$ per pound (present price, 1807).

	<i>Per Week, for 14 Weeks.</i>
New Leicester, 9s. 2d.	$7\frac{1}{4}d.$
South Down, 7s. 6 $\frac{1}{2}d.$	$6\frac{1}{4}d.$

Mr. Young remarks, that they both did bad in the 100 days above-mentioned; but this is an error, which

which was caused by excluding the wool, and it certainly requires much attention to avoid mistakes in such complicated calculations.

<i>Eaten in 100 Days.</i>	<i>No. 1.</i>	<i>No. 2.</i>
Food given,	2314 lbs.	2313 lbs.
Taken up,	106	93
Eaten,	<u>2208</u>	<u>2229</u>

“ The value of the whole of the grass and tares, on the average of the two sheep, appears to be 8*s.* 1*d.* per ton, or 4½*d.* per cwt.

“ On the supposition that grass, &c. loses three-fourths of its weight in drying for hay, a ton would be worth only 1*l.* 12*s.* 4*d.*

“ On September the 7th, they were put to short allowance, to ascertain which would bear starving best; and as at first 30 lbs. a day was given to each, it was now gradually reduced to 10 lbs. a day.

They were weighed again February 16, 1797.

	<i>Weight,</i> <i>Sept. 7.</i>	<i>Weight,</i> <i>Feb. 16.</i>	<i>Lost.</i>
New Leicester, 138 lbs.	138 lbs.	129 lbs.	9 lbs.
South Down, 139	139	119	20

“ Through the short allowance, the same quantity of food was given to both. They were now turned out and weighed again, June 14, 1797, when

Leicester wool 6 lbs. 4 oz.	South Down wool 4 lbs. 6 oz.
No. 1. Leicester, 187 lbs.	No. 2. South Down, 172 lbs.
Feb. 16. 129	Feb. 16. 119
Gain, <u>58</u>	Gain, <u>53</u>

“ Take

“ Take the whole period it will be thus :

	<i>Weight, May 30, 1796.</i>	<i>Weight, June 14, 1797.</i>	<i>Gain.</i>	<i>Gain in Dead Weight.</i>
New Leicester,	121 lbs.	187 lbs.	66 lbs.	39½ lbs.
South Down, ..	124	172	48	29½

“ The advantage, therefore, in every stage of the experiment, is with the Leicester.

“ We found a New Leicester shearling ram killed here, which, upon weighing, was 94 lbs. the carcass ; mutton at 7*d.* or 2*l.* 14*s.* 10*d.* ; to which add 6 lbs. 12 oz. wool, 5*s.* ; in all, 2*l.* 19*s.* 10*d.* He was only 56 weeks old, and had consequently paid 1*s.* 0½*d.* per week from his birth, and had never been fed upon any thing but grass, hay, and turnips. This is a most uncommon profit.”

The inferiority of the Wiltshire sheep seems to be fully proved in the experiments which have been detailed ; but under the folding system of common fields, the result might possibly have borne a different complexion.

The New Leicester, or Dishley breed, possess an aptitude to become fat at an early age, and even under an apparent deficiency of food ; yet, notwithstanding this excellent property, they are allowed to be deficient in certain requisites of another kind, and their superiority to the South Downs is become very equivocal in this county.

The long wool of the Leicester breed is less in demand than was the case a few years since ; and if folding is of the greatest utility, as is generally supposed in Bedfordshire, they are surely but little adapted to that purpose. Their constitution is weak, and unable to bear the fatigue of driving to considerable distances,

and the weight of their wool is a troublesome burthen in bad roads, or hot or wet weather. The shepherds complain they are much liable to disease, as the scab, &c. Their heads are frequently sore, and not easily secured from the attacks of the fly.

The rams are frequently heavy and sluggish, and the ewes produce fewer lambs than is the case with the South Downs; and the milk which they produce for the support of their lambs is small in quantity, as is the case with all other animals which possess a striking aptitude to fatten early.

In consequence of the premiums offered by the Duke of Bedford, the South Downs have been introduced into this county in considerable numbers.

His Grace the Duke of Bedford appears to prefer the South Downs, by the general sale of his Leicester stock, which took place this year.

The South Down breed is kept by the Earl of Upper Ossory, Lord Carteret, Lord Ongley, S. Whitbread, Esq. and various other gentlemen and farmers in the eastern and other parts of the county. They seem to be preferred on account of the fineness of their wool, hardiness, aptitude to fatten themselves and their lambs, and many entertain an idea that they can keep more on the same space of ground than of any other breed.

The latter opinion is, or ought to be, founded on a knowledge of the relative quantity of food consumed by the various breeds; but the experiments of the late Duke of Bedford, warrant no such inference in favour of the South Downs; and such as deem the experiments inconclusive evidence, would do well to institute others of a less equivocal nature.

I have met with only one objection to the South
Down

Down breed, which is from a butcher, who observes, that though they are a good kind of sheep, they will sometimes die as *yellow* as a brass candlestick.

There are not a few farmers in various parts of the county, who entertain an opinion in favour of crosses, as of the Leicester with the Wiltshire or South Down. It is asserted, that such mixed breeds fatten very freely; but if such as maintain that a cross of the Leicester and Wiltshire is better for fattening than the unmixed blood of either kind, are well founded in this opinion, the ideas of Bakewell, and other eminent breeders, fall to the ground. The crossing of various breeds may produce good sheep in many cases, but surely it is not the act of crossing them that does the business.

A Leicester ram may improve the aptitude to get fat, in the progeny of a Wiltshire ewe. But can the same effect take place if the operation be reversed?

If such should be the result, there is nothing too extraordinary to be expected. A Wiltshire ram may improve the wool of the Leicester breed, as also the hardiness, but at the expense of the qualities for which they are chiefly recommended.

Food.—The flocks of the common fields are kept on the commons, and *balks* between the lands, and among the crops of beans in the spring.

In the winter they are kept on the grass land, or sent to turnips, where they can be procured.

Sometimes they are fed with bean-straw, hay, &c. in littered yards, and in the south-east part of the county, where neither turnips nor grass can be procured, the sheep are frequently wintered on the grass land about Barnet, &c.

In the enclosures, tares, clover, &c. are grown for their support in summer, and turnips in winter.

The ewes are seldom put to turnips in winter, as the succulent nature of the turnip is supposed by some to make the lambs too large previous to their birth. And it seems advisable to give hay along with turnips in all cases, as their cold nature seems to increase in sheep a disposition to the *red-water*, and other diseases.

The Swedish turnip, though much esteemed for fattening, is generally thought to produce an insufficient supply of milk for lambs in the spring.

Folding.—The farmers of Bedfordshire are almost invariably advocates for this practice, under all soils and circumstances. The fold is esteemed peculiarly advantageous to the wheat crop. Nothing perhaps except a wet spewy soil, will prevent the folded crops of wheat from being distinguished at a considerable distance, by its deep olive green colour in the spring, when such as has been manured with common yard-dung often looks pale and sickly, and the straw and ears are small at harvest, and the corn not well filled. Its superiority to other manure is often equally perceptible in the crop of barley.

The necessity of folding in the common fields is sufficiently obvious; the manure is useful, and there is no other mode of obtaining it; at the same time, it is apparent, that the sheep of the fallow fields never obtain a sufficiency of food to improve their condition in any considerable degree, and are employed, as it were, for no other purpose than to carry the produce of the commons, &c. upon the arable land in the shape of manure.

The

The folding system in the enclosures bears somewhat of a different complexion, as tares may be grown on the fallows for the support of the sheep; yet there are many occupiers of clay land farms, particularly in the north of the county, who appropriate a part of the pasture to the use of the folding flock. These are termed *sheep-walks*, and are treated in every respect like the ancient commons.

The value of the sheep-fold bears an high estimate in Bedfordshire.

I am informed that a farmer, who lived many years on the farm where these pages are written, used to say, that 300 sheep folded for one week on an acre of land, would increase the produce five bushels per acre.

According to the average price of a load of wheat for the last five years, the value of a sheep's manure (as above) is precisely one farthing per night, which forms a remarkable coincidence with the same opinion derived from other sources.

The clear length of a hurdle when set in a fold, is commonly about seven feet four inches. Four hurdles, therefore, enclose nearly six square yards, or the 807th part of an acre. Forty hurdles set in a square form, will make a fold that will nearly cover an acre in eight nights. Now, if a fold of this dimension be occupied by 225 sheep of various sorts, the folding, at one farthing per night, will be worth 37*s.* 6*d.* per acre; and this estimate seems nearly to accord with the general opinion.

Mr. Wilson, of Ravensden, observes, that the fallow-field folding of that district, consisting of poor starveling sheep, is valued at about 30*s.* per acre; but when the sheep are well fed it is worth 40*s.* or more. Ten sheep are supposed to fold an acre in half a year;

year; but if the sheep are small, ill fed, or mixed with many lambs, twelve, fourteen, or fifteen, are allowed.

Mr. Brown, of Duntun, observes, that moderate folding is worth 40*s.* per acre, and is cheaper at that price than any other manure. Mr. Platt estimates the folding at 40*s.* per acre, which is performed after the rate of twelve sheep to a square pole.

Mr. Atterbury, of Hockliffe, supposes that if the sheep are well fed, such a fold as above described would be worth 50*s.* per acre, which amounts to one-third of a penny each night, or 3*d.* in nine days. On the whole, there is reason to suppose the value of a sheep's manure is worth one farthing per night, or about one-third of the value of their summer food, under every mode of feeding. Each sheep is supposed to manure a space of 2½ square yards per night; and the value of 180 days folding is 3*s.* 9*d.* per head.

The bailiffs of the Dukes of Manchester and Bedford, and of Lord St. John, who are natives of counties where folding is not practised, condemn the Bedfordshire practice as unnecessary, and more injurious to the sheep than beneficial to the crops; and in this opinion they are joined by a very few of the farmers of this county.

Yet I find Mr. Wilson, of Ravensden, an advocate for the fold on poor clays; though not used to it in a former residence in Yorkshire. It is contended, that poor thin-stapled clays cannot be manured without the aid of the fold. The argument is founded on the supposition that, in manuring the soil, a liberal quantity repays the farmer better, in proportion to its expense, than a deficient one; and consequently the pasture must be sacrificed in some measure to the use of the
the

the arable, or the farmer cannot support the heavy expenses of poor soils.

I conceive the argument has a plausible appearance; and such as are in the habit of declaiming against the farmers for neglect in manuring the sward, cannot do better than submit the subject, amongst a hundred others, to an experimental investigation. When tares are grown on a part of the fallows, there are evident reasons for folding the sheep that consume them; but on convertible soils, which are capable of growing turnips, the reasons which are adduced in favour of folding the fallows, appear to me extremely unsatisfactory.

On such soils it is common to make a sheep-walk of the second year's clover-ley, which is to be afterwards sown with wheat; the folding system is therefore, in this case, directly in opposition to the principles that recommended it in the common fields. Instead of collecting as much as possible of the manure of sheep, for the improvement of the crop of wheat, the light land farmer takes every known means of *impoverishing* the field which is to produce his principal crop. The advocates of folding will ascribe the failure of the crop of wheat to the *impoverishing nature of the ray-grass*, or to any thing rather than the true cause.

Mr. Golding, of Biddenham, entertains the opinion, that mowing of red clover is a better preparation for wheat than feeding it. He also observes, that top-folding of clover-ley wheat is more beneficial than feeding upon the clover previous to breaking it up for that crop. Yet, whatever may be the case on strong clays, there is much reason to believe the reverse will be found to take place on loamy and light soils. Feeding of clover and ray-grass, or other seeds, has invariably appeared a beneficial practice at Liddington. Mr. Platt

Platt seldom fails to feed both the first and second year's growth of mixed seeds, and the crops give no indication of an error in practice. The benefit of folding is supposed by many to reside almost entirely in the urine, and as that liquid is incorporated with any kind of soil, almost as soon as voided, the manner, or time of folding, can make little difference in the final result. Yet no considerate farmer will suppose the sweat or perspiration, much less the solid manure, is of little consequence. The advocates of folding are under much apprehension that the sheep will not distribute their manure equally, unless much pains be taken to imprison them with hurdles; but I believe they are not more deficient in this respect than other animals. They are observed to lie much in cart-ruts, and other hollow places, in very hot weather, and to hide themselves under hedges and trees in any kind of weather which does not suit their constitutional feelings; and where is the propriety of denying them those retreats which are necessary to preserve their health and vigour?

But, on the other hand, the most elevated spots are much frequented by sheep in summer; and as such are generally the poorest parts of the field, the circumstance is in favour of allowing sheep, as well as other animals, their natural liberty. Some farmers seem contented to gain little by their sheep besides the value of their manure; but sometimes apparently without reflecting, that the manure belongs to the farm, and would enrich the field where the food is produced as much as any other part of the farm. Others assert, that no kind of manure is so cheap as the fold; yet the summer food of a sheep will be worth 11s. 3d., and the manure no more than 3s. 9d. according to a common

mon estimation. It is further asserted, the carriage of sheep-dung costs nothing; but the wear and tear of hurdles, and the extra expense of shepherding, amount to something considerable in a flock of folding sheep, and there are other kinds of indirect expense, which are probably of a much greater amount. Folding is a species of work, and the sheep which are occupied in it consume (if they are permitted) more food than such as lie at rest, in preparation for the butcher, but which the exercise they receive in driving to considerable distances, causes to pass through the skin by perspiration, instead of being converted to flesh for the use of man.

Mr. Smith, of Kimbolton, says, if a farmer gains 3s. or 4s. by the fold of a sheep, he will lose as much in the carcass.

Much more might be said on this subject, were it not sufficiently obvious, that the merits of folding rest entirely on its *local application*. The value of half a year's folding (or 3s. 9d.) is obviously no article of gain, acquired by driving the sheep from one place to another, and confining them to particular spots by hurdles; because there is much reason to believe, the manure may be worth more than 3s. per sheep, in whatever part of the farm it may chance to be deposited.

Wool.—The shearing of sheep generally takes place in the first two or three weeks of June.

Farmers are not anxious to shear the sheep in that extremely neat and close manner which has been recommended, as they suppose that the expense would be increased by this means as much perhaps as the wool; and when the skin is thus suddenly exposed to the burning rays of the sun, the sheep are liable to sustain much injury.

SECT. III.—HORSES.

“THE farmers’ teams are chiefly kept up by yearling and two-years old colts, brought by dealers from the Fens of Huntingdonshire and Lincolnshire. Some farmers practise the selling off their cart-horses for more valuable purposes, to profit, at six or seven years old; but the practice is not general. In the southern part of the county, where the farmers keep a road-team to carry the produce of the land towards London, and to bring back London manure, such as sheep’s trotters, horn shavings, rabbits’ and fowls’ dung, &c. &c. such teams are kept very high, and, of course, at a very great expense; and I am of opinion, that the farmer’s returns do not compensate for such extra expense*.”

Some of the most attentive farmers will not allow of any decline in value in the horse; but contend, they may even be made an article of profit, though certainly not in an equal degree with other kinds of stock.

Mr. Long, of Stondon, who keeps 14 or 15 horses, and has had the experience of much more than half a century, believes that, with proper attention, “the living will more than pay for the dead.” The negligence of some farmers, forms a part of the profit of the others; for, though the value of horses must sink to nothing in the employ of their final possessors, a ready sale is constantly found for any strong seasoned horse which a farmer chooses to dispose of. Many farmers are in the practice of breeding colts; and the prices which some have obtained at two years old (such as from 25*l.* to 32*l.*), afford an ample proof that the horse

* Original Report in 1794.

repays the expenses of a few years, and perhaps in a higher degree than any other animal. It is remarkable, that those who use only a pair of horses for ploughing in all cases, are the most ready to admit a rapid decline in the value of them. In reply to a question of this kind, it was remarked by an intelligent farmer, that a good horse would probably cost 35*l.* which ten years' labour would perhaps reduce to 5*l.* The decline in value is therefore 3*l.* per annum, a great part of which must be deducted from the other acknowledged advantages of ploughing with a pair of horses. Mr. Platt, of Liddington, estimates the yearly decline of value, after six years of age, at 8*l.* per cent.

The number of acres which a horse is able to cultivate, is supposed to vary between 20 and 30, according to the soil and course of crops.

A frequent return of fallow or turnips, increases the labour of horses very considerably : clover diminishes this article of expense in the same proportion, and the system of feeding mixed seeds, may be said to take a portion of land, for two or more years, entirely from the article of tillage.

Expense of Food, &c.—This article of expense is extremely various, according to the disposition and local circumstances of the farmers.

The horse that works all the winter season, will require more food in proportion to his work, than others which have two or three months' leisure ; and the horse that toils eight hours per day, must be more expensively fed than another that is employed but six or seven hours per day. Severe or long-continued labour may also be expected to increase the decline in value
very

very rapidly. These circumstances are here enumerated, because they are frequently overlooked in calculation, though they can scarcely be unknown to any practical farmer.

Mr. Wilson, of Ravensden, allows a peck of corn per day to three horses, and sometimes gives them green tares in summer.

Mr. Grant, of Leighton, allows twelve single bushels of bran, and two bushels of beans per week, for seven horses.

Mr. Sutton, of Muggerhanger, gives a peck of oats per horse, when at work; at other times, only half that quantity.

Mr. Wilson, of Holme, observes, that a great allowance of corn in winter is prejudicial, as it makes the horses' coats turn of a dingy colour, and in the spring they are unable to eat or work. Mr. Wilson adds, that 100 acres of fallow may be tilled by twelve horses.

Mr. Runciman, of Woburn, employs eight horses for 200 acres. This gentleman ploughs with a pair of horses, and, I believe, makes them perform much labour with an allowance of a gallon of oats and half a gallon of split beans per day per horse, with hay in winter.

Lord Ludlow keeps seven horses at Cople, with an allowance of a bushel of oats per horse per week all the year, with green tares in summer, and hay and chaff in winter. They are not turned into the straw-yard, as is the custom with many farmers.

Mr. Thompson, of Sundon, estimates the food, &c. of horses, at about 30*l.* per annum. Four horses to 100 acres, at one peck of oats per day.

At Prisley-farm, in Flitwick, when occupied by the
Duke

Duke of Manchester, the practice was, to plough with a pair of horses from six till eleven o'clock in summer, and a second journey with the same team from one till six in the evening.

Mr. Golding, of Biddenham, keeps six horses: his predecessor kept nine for the same land, which explains (says Mr. Golding) the advantage of ploughing with two horses a-breast.

Mr. Agutter, of Salford, keeps six horses to cultivate 100 acres (called 135) of open-field land. They work from seven to one o'clock, and eat nothing but hay and grass; and Mr. Agutter thinks they look as well as is the case with horses in general.

J. Foster, Esq. pursues nearly a similar system on some strong clays at Bedford. "I have always some acres of tares for summer keep for the horses; they live entirely upon this, and the pastures, from May to November, and in winter upon hay and chaff, without any corn at any season of the year; and whoever has noticed them, will surely allow that they are far from being deficient in flesh or in vigour, and are scarcely ever out of health. If it can be proved that farming horses never want corn, will not much of the argument urged in favour of oxen be done away?"

An opinion may be formed of the average value of live stock in this county, in comparison with that of others, from the following statement by Mr. Platt, of Lidlington:

	£.	s.	d.
Cows, oxen, &c. rejecting weaning calves, &c.	16	0	0
Working horses,	20	0	0
Sheep and lambs after Midsummer,	1	10	0
Swine, at six months old,	1	10	0

The general hazard of death, &c. 5*l.* per cent.

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It is obviously a difficult matter to form a correct estimate of the average value of the various kinds of cattle.

The value of cows and sheep has declined very considerably since the beginning of the present year (1807).

SECT. IV.—HOGS.

THE swine of Bedfordshire are mostly mixed breeds, many of which partake more or less of the Berkshire kind. Mr. Platt, of Liddington, prefers a cross between the Suffolk and spotted Leicester.

Mr. Pickford, of Market-street, keeps 4 or 500 of these animals. He gives them green tares, and frequently clover, in summer, and Swedish turnips in winter, which are capable of keeping them in good store condition. A very considerable and intelligent farmer gave an opinion, that hogs will pay for milk, but not for corn. On reporting this opinion to a small farmer, he observed in reply, "that if swine will not pay for corn, what animal will pay for it?" Mr. Poole, of Milton Ernest, has a high opinion of the utility of hogs, as the manure they make is preferable to that of almost any other animal. Mr. P. further observes, that small farmers are generally most attentive to swine, which may be taken as a proof, amongst many others, that those who manage large concerns, generally bestow a very partial attention on some branch of their business.

If pigs will not repay the expense of pease, it is surely an agricultural phenomenon, that this species
of

of corn should meet with such a ready sale as is commonly experienced.

Mr. Agutter, of Salford, thinks that swine will generally pay for pease or beans ; and that the dung must be considered of much value, if nothing more is cleared. A farmer in this neighbourhood kept many hogs, some years ago, on old beans. They were employed in this way, because they would not answer the expectations which caused them to be laid aside for sale. One hog was sold at 13*l.*, and paid 13*s.* 6*d.* per-week for its keeping, which consisted of two bushels of old beans per week on the average, at 6*s.* per bushel. Most of the others produced more than the value of the beans. In many parishes there are several of the labourers who keep a pig ; and it may be presumed, that a constant, or even frequent loss, would soon put a period to this business.

I have been told, that some person of Hockliffe formerly kept hogs without either wash or water, by filling one trough with beans, and another with raw potatoes. Barley, pease, or potatoes, have been boiled occasionally for the use of hogs. They are also soiled, in some instances, on tares or green clover ; and have even been folded in the same manner as sheep, by the use of hurdles boarded at the bottom.

The Swedish turnip is excellent for store pigs, as it may be given in a straw-yard, and prove a means of making much manure of a good quality.

The improvement of the breed of animals has almost monopolized the attention of modern agriculturists ; yet as they have not been unanimous in opinion, it may

be proper to make a few remarks on what are deemed the fundamental principles of the art.

The offspring is generally considered to partake equally of the form and other qualities of the male and female parent ; from which it results, that a male of the improved kind will remove one half of each of the defects of any other breed by the first cross, three-fourths by the second, and seven-eighths by the third, &c. The intention of crossing various breeds together, has therefore no other object than to improve the inferior kind ; and those who speak in praise of the mixed breeds (as the half-bred South Down and Leicester), must consequently deem those celebrated animals severally defective in some essential point. The quality of becoming fat in a short time, is commonly considered the most valuable of all ; and this predisposition is pretty accurately marked by the regularity of the form, and a general fulness and rotundity of every part of the body, which is most valuable, and is often connected with a size rather small than otherwise.

If the chest is narrow, the lungs have not room to perform their office ; and as this circumstance is said to shew a predisposition to consumption in the human species, it will scarcely indicate a disposition to become fat in animals. A belly more capacious than common is considered as a characteristic of animals which have ceased to return an adequate profit, in flesh, milk, &c. for the extra quantity of food which they consume. In young animals it shews a diseased state, and often appears in weaning calves that have been kept at short allowance.

It is supposed, that not only the perfections and imperfections of form, but also the peculiarities of habit and disposition, are continued, with a few accidental devia-

deviations, in the offspring of all kinds of animals ; but I conceive the primary intention of Nature forms a medium between all the extremes.

The cow is intended to produce milk, as well as animal flesh ; and when the effects of starvation, or the continued propagation of some accidental deformity, has depraved the breed, the intelligent grazier has the power to restore the original shape, by a proper selection of the best kinds, and thus the quantity of both milk and flesh will be increased, without any correspondent increase in the quantity of food consumed.

Thus far the intention of the breeder is rational and well founded ; but if any efforts are made to go beyond Nature, disappointment is sure to be the ultimate result. The removal of evident defects must be considered as a genuine improvement ; but to cultivate *peculiarities*, is only a local business, the expense of which is almost invariably the loss of some other good quality.

An immoderate increase in the quantity of flesh, milk, or wool, depraves the quality. An inordinate degree of fatness diminishes the milk, lessens the number, and starves the progeny : it also diminishes the vigour and hardiness of the breed.

It is however of local, though not of general utility. A sheep may properly have such a load of fat, as to find it inconvenient to walk more than 20 yards per day, if its food be at no greater distance ; but the sheep of bleak mountainous districts, and the folding flocks, must possess hardiness and strength, at least, whatever good qualities beside may be absent.

There are few farmers who bestow no attention upon improvement of breeds ; yet as no improvement takes place in general, it may be suspected that there is a

natural tendency to degenerate in animals ; and if the ingenuity of man is able to counteract this tendency, it ought to form the utmost bounds of his hopes. The influence of soil and climate on the conformation of animals, is little known ; but, generally speaking, whenever any part of the body is larger or smaller than common, it is a sign of degeneracy. Such is also the case with the size of the animal. If the power of the breeder was sufficient to vary the size of sheep from the rabbit to the ox, he would be rather a creator than an improver, as such a result appears to be no part of the design of Nature ; neither do I conceive there can be any propriety in attempting to alter the (average) size of animals.

SECT. V.—RABBITS.

THIS kind of live stock, which formerly made a conspicuous figure on the warrens of Sandy, Ampthill, Millbrook, Steppingly, &c. appears at this time to be little attended to with a view to profit, except on a small warren in the latter parish.

It is well known that, however profitable they may be made to the occupiers of warrens, they are unavoidably a public nuisance, destroying the young hedges and corn in every direction.

Since the warrens have been destroyed, the remaining rabbits have in several places retreated to the barren sandy hills which have been sown with furze, &c. In such situations, if numerous, they will frequently almost destroy a year's shoot of the young furze or whins, as well as prove of essential injury to the corn and turnips in

in the neighbourhood ; neither does it seem possible by any ordinary means, to dislodge them from such situations.

SECT. VI.—POULTRY.

UNDER the term poultry, is comprehended the various kinds of fowls, ducks, geese, turkies, &c.

In situations where poultry are much attended to, they generally form a part of the daily care of the mistress of the family ; hence, as may be foreseen, they are often entirely neglected by genteel farmers, while those of a lower class deem them objects of considerable profit.

Common fowls have been condemned by some writers, as well as some large farmers in this county, without the support of one solitary experiment. It is asserted, they never make a price which will repay the trouble and expense attending them. They are known to produce a great many valuable eggs, their feathers are useful, and their flesh is esteemed as a luxury, fit for the tables of princes. It is known also, that luxuries in general pay the expense of their manufacture, more liberally than articles which are in more common use ; and if this is not the case with poultry, it proves nothing more than the ignorance of those who rear them, who would certainly lessen their number, if they conceived the demand was not equal to the expense. The ignorance of those who breed fowls, is not, however, easily proved as a general question ; but the experience of many centuries must be allowed as an argument of some weight on the contrary side. In

farms of moderate size, where the farmer's mind is sufficiently occupied on the important concerns of business, he frequently knows little more of the poultry, than that the mistress requests him to preserve a few bushels of offal barley for their use when the corn is thrashed out, and their usual supply from ill-thrashed straw has failed. This request sometimes gives rise to little domestic sparrings, in which the farmer contends that "*fowls eat their heads off*," while his wife endeavours to convince him that he knows nothing about the matter. The principal use of fowls is, to pick up the corn that would otherwise be lost; and if they obtain some of their food from the stacks of corn, a part of this is such as would otherwise be consumed by sparrows, rooks, or pigeons: but I have heard it asserted, that a considerable profit has been derived from fowls that cost nothing in feeding, nor had any access to the rick-yard.

The manure of fowls is of considerable value, and will be probably equal to one-third of the price of the corn they eat; such, at least, is said to be the case with sheep, when feeding on corn and turnips.

"An open-field farm, of 30*l.* per annum, has produced annually from thirteen to sixteen guineas from this article only; while the occupier of a modern enclosure, of eight times that rent, raised no more than supplied his own table*."

Much of what has been said respecting the yard-fowls, might be equally applied to ducks, which have the recommendation of destroying great numbers of worms, &c. on the pasture land.

Geese are kept by many farmers, under the idea that

* Rev. Mr. Cooper's Letter to the Bishop of Lincoln.

they

they preserve the health of the cows in the pastures where they feed. They are supposed to prevent staling of blood, by some undefined effect upon the water, the hardness of which is thought, in some cases, to produce the disorder in question. Others object to their use, on account of their fouling and injuring a great quantity of grass near their haunts.

It is not easy to find means to ascertain the amount of their utility to a farmer; but to the poor in the neighbourhood of extensive commons, as of Flitton, Flitwick, &c. their profit is often very considerable.

Many turkies were kept at Oakley before the enclosure. They are also kept in several other places, but nothing seems to be known experimentally of their value. They require much care and attention while very young, as the sting of a nettle is said to be capable of killing them.

SECT. VII.—PIGEONS.

THE increase of these birds seems to be not so much encouraged as formerly; but there are a considerable number of them in various parts of the county. Pigeon-houses are sometimes built of timber plastered, &c. and sometimes of brick.

The manure made by pigeons is highly esteemed as a top-dressing for wheat, and other corn, and is perhaps as useful as soot in that intention.

They are a profitable stock to the farmer who owns the dove-cote; but a considerable part of the profit is a kind of public plunder, being derived from the corn-stacks and fields of the neighbouring farmers.

They are great enemies to thatched buildings and clay

clay walls, which they seem to find great pleasure in destroying. Among several bad qualities they seem to have a good one, which is perhaps common to many other birds, and consists in their devouring a great quantity of the small seeds, as of the corn-marigold, &c. which are sometimes very numerous on the surface of the ground after harvest, and are thus converted into a valuable manure, instead of remaining a nuisance.

SECT. VIII.—BEES.

IN the original Report, Mr. Stone passed some high encomiums on the utility of this industrious insect, from which the following is extracted: "The means of producing the greatest possible profit that can be derived from soil, cannot be completely pursued, until the production of honey and wax is fully attended to. Upon a moderate calculation, in which I have been assisted by Mr. Wildman, of Holborn, a person who has made this species of profit his particular study for many years, every square mile in Great Britain would produce in those articles, on an average, 100*l.* sterling in value, admitting that an increase of product would reduce the price of those articles. But such an increase in the quantity of bees-wax, would consequently tend to render the importation, not only of those articles, but of tallow, unnecessary to the present extent. The value of these articles, on this statement, far exceeds the idea of the most sanguine friend to the prosperity of the country.

"There are in England alone 49,450 square miles, and in Scotland 27,794—total 77,244; which, at 100*l.*

per

per square mile, would produce 7,724,400*l.* per annum.

“At only 20*l.* per square mile, the produce would be 1,544,880*l.* This is an object well worth attending to, being in addition to every other profit derived from the soil.”

Mr. Stone has not stated the basis on which the above calculations were founded, but I believe his lowest estimate of possible gain is at least five times, but probably ten times, as much as is actually gained from honey and bees-wax in this county. Mr. Butt, of Clophill, has attended to bees, perhaps more than any other person in the county, and has sometimes possessed from three to four score hives; but his situation, being in the vicinity of woods, and warrens covered with heath or ling, was a very favourable one; as they are known to derive much of their subsistence from such situations, and in some years will scarcely exist, much less flourish, in a well cultivated neighbourhood. Mr. Maxey, of Knotting, had a crop of rape, which was seeded last year (1806), and produced such abundant employ for the bees, that Mr. Maxey supposed one man, who kept a considerable number of hives, would gain 5*l.* by the seeding of the rape.

Bees are kept more by cottagers in good circumstances, and small farmers, than by large ones; and it is probable that such as understand their management may derive a considerable profit from them.

Some people entertain the superstitious opinion, that bees never flourish after the death of their owner.

CHAP. XIV.

RURAL ECONOMY.

SECT. I.—LABOUR.

THE greatest part of the business of husbandry is performed by day-labourers in every part of the county. It is common, however, on most farms of considerable size, to retain annual servants in the capacity of horse-keeper, cow-man, shepherd, and kitchen-maid, though the great advance in the price of provisions has apparently contributed to diminish the number of domestic servants of every description.

It seems generally agreed, that the horse-keeper ought to attend his horses at four o'clock in the morning, to allow them a sufficient time to feed, and get them properly geared for their work before he takes his breakfast. The team is taken to work as soon as it is light in the winter; at six o'clock, or the time when the day-labourers come, in the spring; and about five, or as soon as convenient, in harvest. About ten o'clock, an interval of a quarter of an hour, or more, is allowed for the servants to feed. This is called *beaver time*; but when the business of ploughing is performed by day-labourers, who have no *mess* in the house with the servants, they sometimes delay their breakfast till nine, which generally occupies half an hour.

It is common to finish ploughing from one to two o'clock. The horse-keeper attends his horses in the
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afternoons, and frequently does not entirely leave them for the night till eight o'clock.

I find the prices stated under the names of horse-keeper, head ploughman, second ploughman, &c. from ten to seven guineas per annum, and it is presumed an able man would for the former price undertake the management of six horses, and with the assistance of a boy, two or three more; but there is great variety in this species of management.

The business of cow-man is, with the exception of dairy farms, generally allotted to a day-labourer, who must of course finish the milking in proper time to attend the teams, or other business of the farm.

A shepherd, where the flock is large and valuable, seldom attends to any other business. Mr. Bennet, of Tempsford, who has a flock of five or six hundred of New Leicesters, gives as much as fifteen guineas per annum. I have reason to believe this is not the highest price that is given in the county, though there are many more at twelve, and even as low as five guineas.

The wages of a common servant-maid of *all work*, varies from four to seven guineas, according to the quantity of labour, &c. About five guineas seems the most usual price, though it may be rather below the average of the straw-plait districts in the south-east of the county. Where the farms are large, the business of the dairy becomes more troublesome to the mistress, and as the calls of necessity are less distinctly heard, a more expensive class of servants makes its appearance, under the names of laundry-maid, dairy-maid, &c. whose wages rise as high as nine or ten guineas per annum.

In some places a wheat-barn tasker is hired by the year, who agrees to thrash one load of wheat *per diem*,
with

with an allowance for extra work; but the late unfavourable seasons have contributed to diminish their number, from the great hazard attending any bargain of that kind. Boys of various ages are hired at from two to four or five guineas per annum; and the general time of service commences, or at least concludes, with Old Michaelmas-day, in all cases.

It is common for the servants to dine at the same table as their master, wherever the farms are not very large: some little distinction is made occasionally; but the servants seldom look forward with eager expectation to the pleasures of a separate table.

The breakfast and supper of men-servants consists in general of a *mess* of milk. In addition to this, bread and cheese, and sometimes meat is allowed.

In respect to female servants, tea in the morning and afternoon, is of late years, become nearly a general practice; and the custom of employing them in milking the cows, is fallen into general disuse.

Day-labourers are expected to work as long as the light is sufficient, in the winter; and from six o'clock in the morning till six at night, in summer. Of this nearly an hour and a half are consumed in meals.

The weekly pay of labourers varies from eight to nine shillings, in the west and northern parts of the county. In the south and eastern district, the wages are in general rather higher; as from nine to ten shillings in the greatest part of the district included between Eaton-Socon, Dunstable, and Luton.

There seems no precise distinction between the pay of winter and summer. Small beer is generally allowed; but customs differ with respect to giving the labourer in addition to his pay a *mess*, that is, a common dishful of milk, crumbed with bread, or boiled milk only.

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In these cases, the former is valued at 2*d.* and the latter at 0½*d.* per day.

With respect to the hay-harvest, customs are very various. Sometimes a distinct set of mowers and hay-makers are employed. The former at about 2*s.* 4*d.* per acre, with a quart of ale: the latter from 9*s.* to 12*s.* per week, who generally leave work at six in the evening, unless when carrying the hay, in which case they are generally allowed some ale, or perhaps a supper, when they have finished. There are others who hire their men for a month, allowing them food and three half-pint *horns* of ale, perhaps twice a day; and in this case the hours of labour are usually from five in the morning to seven at night, and their weekly pay is eight shillings.

The labourers which are necessary for the business of harvest, are generally hired by the farmers who employ them, previously to Holy-Thursday, in the towns near Ampthill, as the market held on that day is much resorted to, by such as have not provided situations, or harvest-servants. In other parts of the county, certain markets, and fairs, which happen nearer the time of harvest, are attended for the same purpose, and one shilling, or sometimes a dinner, or supper, is given by way of earnest, or to bind the bargain.

The hours of labour extend in harvest, from sunrise to sunset, or when carrying the corn, as long as the day-light permits.

In the vicinity of Ampthill and Woburn, two guineas and 1*s.* earnest, is generally given for a month in harvest, and wood-carting is probably worth 10*s.* more on the average.

In the eastern, and some other parts of the county, larger prices are often given, but these are frequently

to men who come from distant parts, and consequently cause no expense by wood-carting, &c. At Brömharn the harvest month is stated at 2*l.* 7*s.* with wood-carriage; at Souldrop 50*s.* ditto; at Eaton-Socon 3*l.* to 3*l.* 3*s.*; at Luton 50*s.*; at Sundon 52*s.* 6*d.*; at Stotfold 49*s.* and two loads of haulm straw to burn; at Bidgleswade 50*s.* to 63*s.* with a little haulm.

A pair of coarse gloves is generally given to the men, which they wear when binding the wheat into sheaves; and on the whole, the average expense of the first month in harvest may be stated at 48*s.* or 2*s.* per day, exclusive of food, liquor, and wood-carting or other equivalents.

The mode of living, or the kind of food provided for the men, varies considerably in different places.

With some it is customary to give seed-cakes and ale for breakfast; as well as at wheat harvest-home, &c.; but in general, meat is allowed three times a day, which consists of pork, bacon, &c. with from one-fourth to one-third of butchers' meat, and in general plum-puddings; and three meals on each of the four Sundays in the month. It is customary to allow three pints and a half of ale per day, viz. in the morning, at eleven o'clock, and at four in the afternoon; but in some places, the allowance of ale extends to four or five pints, and one pint per man on a Sunday. The evening of the harvest-home is, as is usual in most places, a scene of festivity, when the harvest men, their wives, and children, and other helpers and neighbours, compose a numerous and expensive assemblage. When the month is finished, the plum-pudding disappears, and daily pay is reduced about Liddington, &c. to 1*s.* but remains in some places as high as 15*d.* and even 18*d.* with food and beer as before.

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In the eastern part of the county many instances are met with, where the harvest-men are hired from *first to last*, as it is termed. It is similar to other kinds of piece-work; the men may be expected to exert themselves to the utmost in their power, but the work may be expected to be less carefully performed, the corn may not be ripe, or sufficiently dry, to carry when it is most convenient, and if wet weather ensues, the master has to chuse whichever he may deem the least of two evils, viz. either to feed a number of men who will do no work out of the field, or to pay and discharge them, and hire others to finish the harvest.

This practice, however, seems much on the decline, in the district where it has been fashionable, and another practice occasionally makes its appearance, which consists in allowing the harvest-men a kind of board-wages, amounting to 5*l.* 5*s.* for the month, with small beer, and three pints of ale per diem, and perhaps a harvest-home supper, and wood-carting. I conceive that this practice has a tendency to dissolve the bond of union which ought at that time to subsist between a farmer and his labourers: their mode of living, as well as every other attendant circumstance, tends to repress their spirit and activity. The origin of this practice, may be often traced to certain domestic declamations on the trouble and expense of cookery, &c. an argument which it is obvious, will not be attended to, except on very large farms; and it may be safely inferred, will never make a figure among the advantages attendant on such occupations.

Family circumstances furnish the means of tracing the price of labour as far back as the year 1741; at which time, day-labourers received 8*d.* per day from one month after Michaelmas to Lady-day, which is

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twenty-one weeks, and 1*s.* per day through the rest of the year, with the addition of their food in the time of harvest. The year's earnings were of course 13*l.* 10*s.* in money, with the addition of a meal perhaps once a week, and a mess of milk with bread every morning, and about five weeks' food in harvest.

Soon after this period, an alteration took place with several farmers in Lidlington, and 9*d.* per day was the regular wages, exclusive of hay-time and harvest. About 1751, the pay in hay-time appears to have been 8*s.* per week, with little ale, or food; and the harvest month 3*l.* with food and some ale. The modern prices have been before-mentioned.

CHAP. XV.

POLITICAL ECONOMY:

CIRCUMSTANCES DEPENDENT ON LEGISLATIVE AUTHORITY.

SECT. I.—ROADS.

THE state of the roads is intimately connected with the nature of the soil, and the facility of procuring materials, as well as the revenues procured from turnpikes, &c.

An inspection of the map will therefore furnish a tolerable estimate of the state of the roads, whether public or private, in every part of the county. The turnpikes, and other roads of the gravelly district, are in general very good. The sandy roads, being chiefly composed and repaired with sandy gravel, are frequently loose and heavy. The roads in the north-west of the county, which are repaired mostly with flat limestones broken with hammers, are frequently rough and uneven; but as gravel is in general very scarce in the clay districts, the roads in such situations (the principal of which extends from Bedford to Kimbolton) shew evident proofs of the state of the adjacent country, which is subject of course to all the disadvantages of roads which in winter are nearly impassable.

The number of turnpike roads is in this county not

inconsiderable; from Bedford as a centre, they lead to Ampthill and Woburn; to Silsoe and Luton; to Shefford and Hitchin, or Baldock; to Great Barford and Eaton-Socon; a new but indifferent road to Ravensden, Bolnhurst, and Keysoe, Pertenhall, and Kimbolton; to Milton Ernest and Higham, with a new branch through Sharnbrook and Harrold; to Turvey and Olney, and to Stagsden and Newport Pagnel.

In addition to these, a turnpike road leads to Dunstable, Hockliffe, and Fenny Stratford, a branch of which passes from Hockliffe to Woburn, and Newport. From Baldock one turnpike-road passes through Henlow, Sandy, Tempsford, and St. Neots; and another passes through Biggleswade and Potton.

The form of the roads is generally convex, and the few concave or wash-ways that may be observed, seem rather the effect of accident than design, and are not likely to be extensively adopted. They are sometimes observed to form a kind of ditch, the sides of which are kept perpendicular by the friction of the wheels of carts, &c. Where a foot-path crosses such roads, it is composed of four posts, between which the wheels and horses pass, and whatever conveniencies may belong to wash-ways in general, they seem little prized in this county.

SECT. II.—CANALS.

THE Grand Junction Canal passes through a very small part of the county; and is productive of all the advantages in its vicinity, which result from a cheap intercourse with the metropolis, and the north-western counties,

counties, in the articles of corn, coal, salt, iron, &c. Various projects have been mentioned for extending the internal navigation of Bedfordshire. By one of these it is proposed to carry a navigable canal from Biggleswade to Shefford, the expense of which was estimated at about 1000*l.* per mile.

From Shefford it was proposed to continue the canal, near the course of the waters in the Sandy district, and passing to the north of Ridgmount, Crawley, and Aspley, to join the Grand Junction Canal at Fenny Stratford, in Buckinghamshire.

A communication between Bedford and Fenny Stratford is said to be practicable by two routes, viz. by Stagsden, or through Brogborough-hill (which would require to be tunnelled) into the Vale of Bedford; but it appears that the gentlemen who must embark their property in this undertaking, are not at present sufficiently convinced of the ultimate benefits which might result from its completion.

SECT. III.—FAIRS.

THE following is, I believe, a correct list of the fairs held in Bedfordshire.

Amphill—May 4, November 30 (St. Andrew).

Bedford—First Tuesday in Lent, April 21, July 5, August 21, October 11, December 19.

Biggleswade—February 14, Easter Saturday, Whitsun-Monday, August 2, November 8.

Dunstable—Ash-Wednesday, May 22, August 12, November 12.

Elstow—May 15 and 16, November 5 and 6.

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Harrold

Harrold—Tuesday before May 13, Tuesday before July 6, Tuesday before October 11.

Ickwell (parish of Northill)—April 6.

Leighton—February 5, second Tuesday in April, Whitsun-Tuesday, July 26, October 24.

St. Leonard's (near Bedford)—November 17.

Luton—April 18, October 18.

Odell—Whitsun-Thursday.

Potton—January 27, last Tuesday in April, first Tuesday in July, Tuesday before October 29.

Shefford—January 23, Old Lady-day, May 19, October 11.

Silsoe—May 13, September 21.

Tuddington—April 25, first Monday in June, September 4, November 2, December 16.

Woburn—January 1, March 23, July 13, September 25.

None of the fairs of Bedfordshire are very considerable, being chiefly adapted to the transaction of the local business of the county. There are however little distinctions which are known to the inhabitants in each neighbourhood, and are of small public importance. They depend chiefly on the season, as Leighton February fair is much resorted to for the sale and purchase of horses.

Woburn March fair is noted for barren cows; and Ampthill May fair is considerable both for sheep and cattle, as it happens at a time when the clovers, and sometimes the natural grass, has made some progress.

them; neither does there appear any weighty objection to the practice.

Selling corn at *pitched markets*, as they are termed, is always attended with an extra expense and trouble, while the selling by sample is performed with great facility. The farmers meet together in some customary place, which is sometimes in the street, but often over a pot of the best home-brewed ale the town affords, where new bargains are made; and the corn which was sold the preceding week is usually paid for, with the customary deduction of 1s. or 1s. 6d. on every ten sacks.

SECT. V.—WEIGHTS AND MEASURES.

LAND is measured by the statute acre; but the nominal acres in many open fields did not exceed three roods. Corn is sold by the Winchester bushel, five of which are commonly put into each sack.

Wheat, rye, beans, pease, and tares, are sold by the load of five bushels; but oats and barley are invariably sold by the quarter. The customary bushel of Bedfordshire, is said to have exceeded the statute measure about two pints, till the general regulation which took place a few years since.

Ale is sold at the public-houses by mugs, pots, tankards, and canters. It is almost needless to say, that the three latter names are applied to the larger measure, or quart, while a mug is a substitute for a pint; but the publicans, or landlords, as they are called, prefer the use of the colloquial names of mug, &c. under the idea that the size of a *mug*, or *pot*, is unknown in the eye of the law.

It is very desirable that a general regulation of ale measures might take place; but there are obstacles in the way, which are not easily removed.

A new Act of Parliament to introduce a general system all over the kingdom, might perhaps be carried into effect; but acting under the authority of laws which have been long disregarded, all the power of the magistracy is frequently of little avail.

Whatever penalty may attach to short measure for ale, &c. it ought to be levied on every offender.

It should not be an affair of accident and caprice, rigorously executed in one town or county, and entirely neglected in the adjacent one; which are circumstances that tend to diminish the respect due to the magistracy, and the laws of the land.

If an ale-seller be punished for making use of short measure, whose beer, in price, quantity, and quality; is according to the custom of the neighbourhood, it is a point of justice to him, to insist that his neighbours shall not offend with impunity; but as this neither is, nor can be the case, under the present system, the offender generally considers himself as the victim of injustice, and regards with contempt that partial administration of a law, which to obey would speedily ruin himself and family.

Fencing is measured by the *acre*, which is only another term for a chain, or four poles.

Faggot-wood, and several other articles, are sold by the great hundred, or six score; and hard wood is sold by the stack of one yard square, and four yards long.

Wool is sold by the tod of 29 lbs. one pound of which is considered as an allowance for the weight of pitch-marks, &c.; but of late years many farmers refuse to allow more than 28 lbs. to the tod.

The

The stone of 8lbs. is in use among the butchers of the south of this county; but north of the Ouse, that of 14 lbs. is more prevalent; and towards the borders of Buckinghamshire, the weight of bacon-hogs is reckoned by the score pounds.

SECT. VI.—MANUFACTURES.

THE manufactures of this county are almost entirely confined to the plaiting of straw, and the making of thread lace; the latter probably employs three-fourths of the female population, with the exception of servants, &c.

Straw-plaiting was formerly confined to the chalky part of the county; but has been so much encouraged within the last few years, that it has spread rapidly over the whole southern district, as far as Woburn, Ampthill, and Shefford.

The price of the plait is very fluctuating, and varies from 50 to 100 per cent.

Some of the plaiters have been thought to make a boast of their earnings, beyond what it is found practical to realize. Many tales have been circulated at Luton, Market-street, Dunstable, &c. of people who could earn a guinea per week in the spring, when their appearance and credit have given reason to suspect there was something which required explanation.

I believe it is an undoubted fact, that straw-plait to the value of a guinea, and upwards, has been sometimes manufactured in one week by a single person; but the expense of the straw, and the time occupied in sorting, whitening, &c. are considerable articles, which,

I am

I am informed, have been often overlooked in those high-sounding calculations.

The art does not seem of difficult attainment: children of ten or a dozen years of age are often mentioned as capable of earning 6*s.* or 7*s.* per week, and even as high as 12*s.* or 14*s.*; but subject, it is presumed, to the drawbacks above-mentioned.

A man of Sheddington, who seemed to think the art of straw-plaiting was very advantageous to the poor, thought it would tend to increase the ignorance of the lower classes, as very young children seem more capable of learning it than reading and writing.

There seems, on the whole, sufficient reason to conclude, that straw-plaiting being more of a local nature has, on the average, been productive of more advantage to the poor than lace-making; but there are some who, perhaps, for want of long practice, may not be able to plait straw with sufficient expedition, that resort occasionally to the lace-pillow, and think that an equal profit is often derivable from that source.

Lace-making is an employment entirely sedentary, and is therefore esteemed prejudicial to health, in common with other inactive occupations. In confirmation of this opinion, Mr. Lysons observes, in his *Magna Britannia*, that “persons travelling through the counties where this manufacture prevails, have been struck with the sickly appearance of the women and children employed in it.”

Children are taught to make lace at about six or seven years old, and they occupy so much of the attention of their school-mistress, that the expense of teaching them amounts to 3*s.* per week, for a month or six weeks, according to their capacity. After they have
learned

learned the rudiments of the art, their ordinary schooling is 6*d.* per week.

The business of school-mistress for lace-makers is performed by the wives of some of the cottagers, who are in the most comfortable circumstances.

The children are frequently two years before they earn more than pays the expense of their thread and schooling.

At about ten years of age, those of an ordinary capacity will earn about 2*s.* per week; and at thirteen, if well attended to, they are supposed to cause little further expense to their parents.

A young girl of sixteen, if not neglected by her friends, will be capable of earning as much money at the lace-pillow, as at any time in future life; and the average earnings of full-grown females is supposed to be very nearly 6*s.* per week. There are some, I am informed, who scarcely clear 5*s.* per week, and a few extreme cases have been mentioned, of earnings as high as 8*s.* or 9*s.* per week. The expense of thread is stated at about one-eighth of the gross value of the lace, and a portion of time is consumed in washing and mending of clothes, selling of the lace, &c.

The lace-makers begin their work in summer at six or seven in the morning, and finish at sun-set, or the dusk of the evening. In the winter, little is done till eight or nine o'clock in the morning, or after breakfast, when they continue their work till ten or eleven at night, and sometimes later.

The prevalence of lace-making causes a scarcity of maid-servants, but the same cause tends to keep down the poor's-rates. The families of those women who do not understand this useful art, are often extremely troublesome to the parishes.

Spinning

Spinning of hemp and cotton is almost entirely laid aside, and very few women attend to any of the business of agriculture.

A considerable quantity of mats are made near the Ouse, to the north-west of Bedford.

SECT. VII.—THE POOR.

ON the employment of this numerous and increasing class of society, the original Report contains the following observations : “ There not being any manufactures in this district deserving of notice, agriculture is the only means of occupation ; but from the unenclosed and uncultivated state of the country, and the little employment and encouragement given by the husbandmen, in respect to constant work throughout the year, the labourers continue with the farmers during the winter season, to thrash out their grain, and on the approach of summer many of them set off to more cultivated counties, where labour is more required ; whereas, were a proper system of husbandry introduced, these labourers would have constant employ in their own neighbourhood, and the number would be annually increasing.”

The state of the county, so far as relates to its open or unenclosed parishes, is materially altered since the date of the above remarks (1794) ; but an anonymous writer, who printed some remarks on Mr. Stone's treatise, contends, that the assertion, that Bedfordshire was at that period in an uncultivated state, in comparison with the adjacent counties, was a misrepresentation.

In 1806, it does not appear that the summer emigration

tion above-mentioned takes place in any considerable degree; but there are a few local varieties which may demand some notice. In the north of the county, employment for the poor is represented as more deficient than in other parts; an effect which is ascribed to the poverty of the soil, in the first instance, which is too common a presage of the poverty of the farmers who occupy it. In this district many of the boys, and some of the men, make lace, in the winter at least, for want of other employment.

In the western district, or the hundred of Redbourn-stoke, lace-making is little practised by the males, and much less than was formerly the case.

From this part of the county occasional, but not numerous, emigrations take place, to assist in hay-making in the neighbourhood of London; a circumstance evidently owing to the small quantity of sward in several parishes. In the east of the county, the population seems comparatively deficient, and they have been commonly supplied with many harvest-men from other parts of this county, as also from the counties of Northampton and Buckingham.

There is no deficiency of employment in the southern district, where the straw manufacture furnishes employment for many males, as well as nearly the whole female population.

The following table is intended to facilitate any comparative observations that may be made, on the rise of the poor's-rates; they are extracted from the Poor's-rate and Population Abstracts, and the rated rental is added by calculation from the rates per pound in 1803.

A General Table of the Population, Poor's-rates, and rated Rental, of the County of Bedford.

Hundreds and Parishes.	Total Po- pulation.	Poor's-rates, &c. raised in 1776.			Poor's-rates, &c. raised in 1803.			Rates per Pound in 1803.		Rated Rental from the Rates per Pound.
Barford Hundred.										
Great Barford, - - -	431	£.	s.	d.	£.	s.	d.	s.	d.	£.
Colmworth, - - -	347	130	4	6	350	1	21	3	9	1872
Eaton Socon, - - -	1625	80	5	0	322	2	0	5	3	1229
Goldington, - - -	339	330	3	8	1614	17	2	4	3	7617
Ravensden, - - -	218	108	11	1	384	18	4	4	0	1924
Renhold, - - -	245	91	4	2	221	18	8½	3	0	1479
Roxton, - - -	465	74	1	6	256	3	9½	3	9	1369
Wilden, - - -	300	109	15	3	266	10	4½	3	9	1425
		95	16	1	208	17	1¼	4	3	985
	3970	1020	11	3	3625	8	7½	Aver. 4	0	17,900
Stodden Hundred.										
Bolnhurst, - - -	225	99	1	6	175	8	11	3	0	1170
Clapham, - - -	157	67	19	7	204	10	0	2	6	1636
Dean, Upper and Nether, - - -	385	97	8	6	322	8	5½	2	9½	2336
Keysoe, - - -	370	165	17	4	472	3	6½	6	0	1573
Knotting, - - -	105	37	8	5	87	7	10½	1	1½	1560
Melchbourn, - - -	229	68	2	0	190	1	7	1	3	8065
Milton Ernest, - - -	300	90	10	11	251	7	2½	5	0	1005
Oakley, - - -	265	59	8	7	324	1	6	4	6	1440
Pertenhall, - - -	190	105	5	6	250	3	9	4	9	1055
Riseley, - - -	576	215	2	10	478	11	3	4	6	2127
Shelton, - - -	100	27	15	4	100	4	4½	4	9	422
Little Staughton, - - -	272	88	1	2	188	0	0	2	6	1504
Tilbrook, - - -	219	48	3	0	136	0	6	2	0	1360
Yielding, - - -	209	62	8	11	218	4	5½	3	4½	1298
	3602	1227	13	7	3398	13	5	Aver. 3	5½	21,551

Hundreds and Parishes.	Total Population.	Poor's rates, &c. raised in 1776.			Poor's rates, &c. raised in 1803.			Rates per Pound in 1803.		Rated Rents from the Rates per Pound.
Willey Hundred.										
Biddenham, - - -	262	£.	s.	d.	£.	s.	d.	s.	d.	£.
Bletsoe, - - -	321	81	8	2	309	0	9	6	6	950
Bromham, - - -	297	77	0	5	395	4	0	4	0	1976
Carlton, - - -	376	62	15	3	305	11	7	5	0	1222
Chellington, - - -	112	99	10	8	200	12	4	6	0	668
Farndish, - - -	68	11	8	6	100	1	0	9	0	232
Felmersham, - - -	201	14	9	1	59	6	0	1	9	682
Radwell, - - -	66	138	3	3	127	12	6	2	9	931
Harrold, - - -	763	—	—	—	105	0	0	2	6	840
Odell, - - -	361	315	18	0	379	9	9	3	1	2463
Pavenham, - - -	417	95	1	6	342	0	0	5	0	1368
Puddington, - - -	413	94	10	4	367	16	8	5	8	1299
Hinwick, - - -	585	77	2	6	422	14	3	4	6	1878
Sharnbrook, - - -	188	101	7	7	381	7	0	4	7	1665
Souldrop, - - -	492	6	18	6	237	13	0	7	0	639
Stagsden, - - -	415	184	18	0	394	1	8	4	9	1692
Stevington, - - -	411	103	19	7	346	9	3	6	6	1066
Thurlough, - - -	15	14	16	8	363	15	2	4	0	1933
Turvey, - - -	226	25	15	8	589	12	11	5	0	2358
Wymington, - - -	6316	90	2	4	154	2	5	2	9	1124
		1957	3	7	5579	10	5	4	9	24,966
Biggleswade Hundred.										
Aswick, - - -	81	16	12	0	83	16	0	3	7	459
Little Barford, - - -	80	24	13	9	56	6	10	1	8	678
Biggleswade, - - -	1650	393	14	8	1722	17	8	5	9	6002
Stratton, - - -	64	—	—	—	—	—	—	—	—	—
Holme, - - -	30	—	—	—	—	—	—	—	—	—
Cockenoe Hatlev, - - -	102	17	8	5	114	5	0	3	0	751
Dunton, and Millo, - - -	330	101	10	10	224	0	6	2	7	2503
Edworth, - - -	90	33	6	9	57	9	6	2	6	459
Everton, - - -	141	36	15	5	111	3	5	4	3	524
Eyworth, - - -	86	27	5	10	120	1	6	2	8	889
Langford, - - -	158	140	15	0	479	0	7	6	9	1421
Potom, - - -	110	215	15	8	873	12	3	6	1	2855
Sandy, - - -	613	182	3	9	371	17	6	2	4	3205
Giltford, - - -	527	66	15	0	121	18	4	2	4	1030
Sutton, - - -	301	99	19	5	242	17	2	2	5	2023
Teningsford, - - -	409	79	13	19	291	18	1	2	9	2130
Wrestlingworth, - - -	330	94	18	0	286	17	4	4	2	1374
	6246	1451	8	3	5262	2	0	3	6	26,317

Hundreds and Parishes	Total Popu- lation.	Poor's rates, &c. raised in 1776.	Poor's rates, &c. raised in 1803.	Rates per Pound in 1803.	Rated Rental from the Rates per Pound.
Clifton Hundred.		£. s. d.	£. s. d.	s. d.	£.
Arlsey, - - -	44	1 6 1 9	273 16 5	4 2	1316
Campton, - - -	316	23 1 2	184 18 5	2 3	1651
Shefford, - - -	474	55 13 4	165 0 11	3 0	660
Clifton, - - -	329	108 11 0	207 12 9	3 9	1098
Henlow, - - -	552	115 3 0	314 9 1	2 3	2807
Holwell, - - -	113	55 4 10	87 4 11	3 1	343
Meppershall, - -	309	88 17 4	242 5 9	3 2	1583
Shillington, - -	479	—	232 0 0	2 8	1744
Upper Standon, -	29	8 9 0	22 0 0	1 0	440
Chickwands (extra paro- chial), - - - }	42	—	—	—	—
Stotfold, - - -	495	139 2 10	362 12 11	5 10	1237
	3542	700 4 3	2092 1 4	Avr. 3 6	12,829
Wixamtree Hundred.		£. s. d.	£. s. d.	s. d.	£.
Blunham, - - -	376	80 4 2	259 11 3	3 10	1358
Muggerhanger, -	345	56 8 4	324 12 8	4 3	1531
Cardington, - -	509	355 16 2	527 3 9	4 9	2205
Harrowden and Fen- lake, - - - }	504	—	225 13 0	4 6	1002
Cotton End, - - }	—	—	165 4 0	4 6	734
Eastcotts, - - -	—	—	367 2 0	4 4	1699
Cople, - - -	403	157 16 8	249 10 3	2 6	1996
Northill, - - -	715	204 2 8	393 0 3	2 3	3508
Upper and Lower } Caldicott, - - }	—	—	—	—	—
Hatch Thornecott, -	—	—	—	—	—
Ickwell, &c. - -	—	—	—	—	—
Old Warden, - -	455	138 5 1	601 0 0	4 0	3005
Southill, - - -	621	205 10 0	1359 18 9	4 10	5642
Broom, - - -	187	—	—	—	—
Stamford, - - -	177	—	—	—	—
Willington, - -	229	76 17 5	148 12 2	1 10	1632
Beeston (in Sandy parish),	180	45 7 1	113 9 8	2 8	852
	4701	1326 7 7	4734 17 9	Avr. 3 8	25,166
Bedford Town.		£. s. d.	£. s. d.	s. d.	£.
St. Paul, - - -	2130	754 5 5	1437 19 7	9 0	3195
St. Peter, - - -	577	148 19 1	297 8 6	5 6	1181
St. Cuthbert, - -	351	111 17 1	193 17 8	4 9	818
St. Mary, - - -	616	196 3 4	380 15 6	5 6	1384
St. John, - - -	254	43 7 5	79 9 0	7 0	227
	3948	1254 12 4	2389 10 3	Avr. 6 4	6805

Hundreds and Parishes.	Total Population.	Poor's-rates, &c. raised in 1776.	Poor's-rates, &c. raised in 1803.	Poor's-rates per Pound in 1803.	Rated Rents from the Rates per Pound.
Manshead Hundred.		£. s. d.	£. s. d.	s. d.	£.
Aspley Guise, - -	679	135 9 11	247 14 4½	2 6	1981
Battlesden, - -	131	106 19 8	229 4 8½	3 6	1209
Chalgrave, - -	553	181 6 11	311 18 7	2 2	2883
Hockliffe, - -	250	66 19 1½	249 13 7½	3 11	1280
Dunstahle, - -	1290	150 0 6	407 13 0½	5 0	1650
Eaton Bray, - -	581	209 13 8	428 4 7	4 3	2019
Eversholt, - -	715	157 13 7	465 16 11½	5 9½	1611
Harlington, - -	844	124 2 5	267 16 3	2 8	2012
Holcut, - -	65	96 9 7	196 2 9	3 3	1210
Houghton Regis, - -	781	237 8 1	457 15 4	2 0	4577
Husborn Crawley, - -	541	121 6 3	259 1 3	3 0	1726
Leighton Buzzard, - -	1963	469 2 4	1114 5 1	7 0	3183
Billington, - -	200	54 0 6	205 12 11	4 6	913
Eggington, - -	206	69 15 5	286 9 0	7 0	618
Heath and Reach, - -	541	180 0 0	357 0 2	5 6	1298
Standridge, - -	262	93 19 8	220 3 11	3 6	1253
Clipston, - -	-	-	-	-	-
Milton Bryan, - -	332	89 10 7	199 10 3	3 0	1330
Postgrave, - -	157	68 1 11	153 6 0	2 0	1533
Salford, - -	210	50 0 9	142 3 10	3 3	877
Stodham (part of), - -	99	45 0 9	40 0 0	0 7	1379
Market-street, - -	225	101 15 11	84 5 7	6 0	280
Humbershoe, - -	-	-	82 5 4	6 0	274
Tillsworth, - -	195	43 0 9	136 18 0½	2 8	1029
Tingrith, - -	116	90 14 2	153 19 11½	4 9	649
Totternhoe, - -	382	73 7 4	245 9 10	4 0	1227
Toddington, - -	1145	304 16 10	1137 0 0	3 3	7018
Claulton, - -	-	-	-	-	-
Westoning, - -	410	139 16 10	276 8 10½	3 2	1749
Whipsnade, - -	140	27 5 8	101 0 6	2 0	1010
Woburn, - -	1561	456 14 8	941 13 1	6 0	3138
	14,087	3044 14 7	9398 13 9½	Ave. 3 10½	51,200

Hundreds and Parishes.	Total Population.	Poor's-rates, &c. raised in 1776.			Poor's-rates, &c. raised in 1803.			Poor's-rates per Pound in 1803.	Rated Rental from the Rates per Pound.
		£.	s.	d.	£.	s.	d.	s. d.	£.
Redbournestoke Hundred.									
Ampthill, - -	1234	239	4	0	532	6	1	5 0	2129
Cranfield, - -	961	221	1	5	669	6	11½	4 6	2974
Elstow, - -	475	76	12	3	407	16	0	4 2	1957
Flitwick, - -	436	128	8	6	115	2	7½	4 0	575
Houghton Conquest,	507	158	16	7	419	14	0	3 9	2244
Kempston, - -	1035	461	6	11	994	10	0	4 0	4972
Lidlington, - -	559	132	19	11	410	11	11	3 9	2350
Marston Moretaine,	709	268	11	11	677	8	6½	2 10½	4739
Maulden, - -	738	130	18	8	505	9	1½	4 10	2097
Millbrooke, - -	327	89	13	8	273	19	7	3 1	1778
Ridgmount, - -	581	126	13	0	357	8	5	3 0	2382
Steppingley, - -	264	90	12	0	114	1	0	2 0	1140
Wimhamstead, - -	477	162	17	6	376	16	4½	3 6	2153
Wootton, - -	732	231	12	11	558	9	1	4 0	2792
	9035	2519	9	3	6442	19	8½	Avg. 3 9	34,282
Flitt Hundred.									
Barton, - -	448	107	8	3	151	3	8½	3 11	707
Caddington, - -	319	124	8	9	246	17	3½	4 6	1097
Clophill, - -	706	162	13	9	395	9	6½	4 6	1757
Flitton, - -	292	60	19	1	174	14	4	5 2	677
Silsoe, - -	447	144	8	10	356	18	6½	4 0	1784
Lower Gravenhurst,	48	32	15	0	41	19	5	1 3	676
Upper Gravenhurst,	201	36	14	11	71	0	0	2 0	710
Hawnes, - -	588	195	6	2	560	16	6	5 0	2240
Higiam Gobron, - -	91	104	5	0	106	0	0	2 6	848
Luton, - -	3095	1279	17	3	1465	14	4½	3 0	9770
Pulloxhill, - -	317	57	18	6	356	13	5½	3 8	1948
Shillington (part of),	420	228	8	4	138	0	6½	1 6	1840
Streatley, - -	209	93	16	0	145	7	0½	1 9	1670
Sharpinhoe, - -									
Sundon, - -	315	132	4	10	231	14	3	2 6	1853
	7496	2761	4	8	4542	9	2½	Avg. 3 2½	27,577

Hundreds.	Total Population.	Poor's-rates in 1776.			Poor's-rates in 1803.			Rate per Pound in 1803.	Rated Rental.
		£.	s.	d.	£.	s.	d.	s. d.	£.
Barford,	3970	1020	11	3	3625	8	7½	4 0	17,900
Stodden,	3602	1227	13	7	3398	13	5	3 5½	21,551
Willey,	6816	1957	3	7	5579	10	5	4 9	24,966
Biggleswade,	6216	1481	8	3	5262	2	0½	3 6½	26,317
Clifton,	3542	700	4	5	2092	1	4½	3 6½	12,829
Wixamtree,	4701	1326	7	7	4734	17	9½	3 8½	25,166
Manshead,	11,037	3944	14	7	9393	13	9½	5 10½	51,206
Redbourne-stoke,	9035	2519	9	2	6412	19	8½	3 9	34,282
Flitt,	7406	2761	4	8	4542	9	2½	3 2½	27,577
Bedford Town,	3948	1254	12	2	2389	10	3	6 4	6803
Total of the county of Bedford,	63,393	18,193	9	4	47,484	6	7½	Avg. 3 9½	248,599

Population, &c. of Bedfordshire.

Total resident population,	<i>Number.</i> 63,393	
Males,	30,523	
Females,	32,870	
Persons chiefly employed in agriculture,	18,766	
Ditto in trade, manufactures, or handicraft,	13,816	
Ditto who are not stated to have any employment,	30,811	
Inhabited houses,	11,888	
Families,	13,980	
Persons in each family, including the military, &c.	4 ⁶ / ₁₅	
Persons in each house,	5 ¹ / ₄	
Amount of the population at three periods, deduced from the Registers of the Population Act by Mr. Rickman: one-thirtieth is added to the resident population, on account of the military, &c.	1700	48,500
	1750	53,900
	1801	65,500

Propor-

Proportion of population in 1801 to annual marriage in five preceding years,	<i>Number.</i> 115 $\frac{7}{8}$
Inhabitants to each square mile,	141
Acres to each inhabitant,	4 $\frac{1}{2}$

A Table, exhibiting the various Particulars of the Poor's-rate Abstract.

	Number.	Per Centage on the Population.	Total Expense.
			£. s. d.
Money raised by rates, - - -	—	—	47,484 6 7 $\frac{1}{2}$
Expenditure in suits of law, removal of paupers, and expenses of overseers, and other officers, - - -	—	—	1,175 3 10 $\frac{1}{2}$
Expenditure for other purposes, as church-rate, county-rate, highways, militia, &c. - - -	—	—	8,429 12 10
Total expenditure on account of the poor, in the year ending at Easter, 1803, - - -	—	—	38,070 3 8
Persons relieved who were parishioners, - - -	7276	12	37,944 1 8
Average expense of each person, - - -	—	—	5 4 5 $\frac{1}{2}$
Ditto per week, - - -	—	—	0 2 0
Persons maintained in workhouses, - - -	674	1	8,440 5 9 $\frac{1}{2}$
Average expense for each person, - - -	—	—	12 10 5 $\frac{1}{2}$
Ditto per week, - - -	—	—	0 4 9 $\frac{1}{2}$
Persons relieved who were not parishioners, - - -	760	—	76 2 0
Supposed expense of each, - - -	—	—	0 2 0
Friendly Societies, - - -	75	—	—
Ditto which are entered at the Quarter Sessions, - - -	16	—	—
Number of members in the several Friendly Societies, - - -	2730	4	—

A Synoptical View of the apparent Causes of the Increase of the Poor's-rate.

Periods, - - -	1680.	1776.	1785.	1803.
Amount of the poor's-rate in England and Wales, - - -	£. 665,362	1,719,029	£. 2,129,791	£. 5,246,506
Amount of the poor's-rate in Bedfordshire, - - -		18,193	22,638	47,484
Rise at different periods, - - -		—	4,445	29,291
Average price of wheat per quarter, - - -	2l. 4s. 9d.	2l. 4s. 9d.	3l. 10s.	
Correspondent amount of poor's-rate, - - -	18,193l.	18,193l.	28,458l.	
Rise in the rates thus accounted for, - - -	—	—	10,265l.	
Increase of population from 1776 to 1803, at 27 $\frac{4}{10}$ per annum, - - -	—	—	Persons. 6141	
Additional subjects of the poor's-rate, or 12 per cent. on the population, - - -	—	—	737	
Increase of expense, at 5s. 4d. per head, - - -	—	—	3832l.	
Rise of rates accounted for as above, - - -	—	—	14,097l.	
Rise of rates not accounted for, but referred to the observations as below, - - -	—	—	15,194l.	
The price of labour has risen nearly in proportion to the price of wheat, - - -	11 $\frac{1}{2}$ d.	—	1s. 6d.	

But there is said to be a deficiency, caused by the cessation of charitable contributions to the sick, &c. and occasional meals to the labourers, and also by taxation of many necessities of life used by the poor.

Increase of military and county expenses.

Extinction of independence by consolidation of farms, consisting of 4 $\frac{6}{10}$ persons in each family.

For every three farms, however small, which are annihilated, more than one pauper, at 5l. 4s. per annum, is created.

Extinction of the spirit of independence by the above cause, and others, which destroy the stimulus of hope in persons of small property, and the more enterprising part of the poor.

Luxury of the poor, in the general use of wheaten bread, tea, snuff, tobacco, and costly clothes in young girls, which arises from the want of an adequate stimulus to provide for sickness or old age.

Idleness arising from increasing profligacy, or a diminution of exertion from a deficiency of employment.

Increasing expenses from illegitimate children and their mothers.

An indiscriminate relief of distress, arising from idleness and profligacy as often as misfortune.

The preceding table requires little explanation ; but every observation which may tend to explain the true state of the poor, may be considered as useful.

The rise of the poor's-rate in 27 years is very considerable ; yet it is obvious from the table, that about one-third of the alteration has been caused by the advance in the price of wheat, &c. and is therefore only *nominal*. The increase of population within the last half century, is sufficient to account for about one-eighth of the increase, by regular deductions from the poor's-rate abstract of 1803 ; but the real operation of this cause is more extensive than appears in the calculation.

The poor are not very economical in many cases ; the use of rye for making bread has evidently declined ; tea is an expensive substance, which possesses little if any nutritive powers ; snuff and tobacco are only luxuries to a depraved appetite, yet many of the poor consider them amongst the most indispensable necessities of life, and often expend from 6d. to 1s. and in some instances as far as 2s. per week, in these articles.

Home-brewed ale is scarcely tasted by the labourers, unless in hay-time and harvest, yet such as can afford it, purchase from the public-houses. A moderate use of ale is certainly no sign of a depraved appetite, yet those are highly criminal who starve their family by this means. Such are the apparent means by which the poor hasten the period of an ignominious dependence on parochial support.

The female sex are fond of the luxury of dress : the lace-makers and female servants, who receive from four to seven or eight guineas per annum, can afford to purchase a pair of shoes every three or four months, and other apparel not much inferior to that of their

employers; in consequence of which, in a few years after marriage, they become dependent on their parish for food and clothing, household furniture, and even rent.

The laws of the land seem incapable of alleviating the misery of a family with a profligate father; but an indolent mother is perhaps as frequent an evil, and still farther beyond the reach of a remedy.

The making of thread-lace is almost the sole employment of women in the north and middle parts of the county; but there are few parishes that do not afford several instances of women, whose whole employment consists in nursing their children.

The increase of population has caused a deficiency of employment, which is so remarkable in some seasons, that a great proportion of the labourers "*go the rounds.*" This practice is not modern; but as it is not supposed to be sanctioned by law, it may be proper to describe the nature of it, and its general consequences. When a labourer can obtain no employment he applies to the acting overseer, from whom he passes on to the different farmers all *round* the parish, being employed by each of them after the rate of one day for every 20*l.* rent. The allowance to a labourer *on the rounds*, is commonly 2*d.* per day below the pay of other labourers, which is found to be a necessary check upon those who love liberty better than labour. Boys receive from 4*d.* to 6*d.* per day *on the rounds*, the whole of which is often repaid to the farmers by the overseer. About half the pay of the men is returned in the same manner, and the farmers often receive in this way the amount of from 2*d.* to 4*d.* in the pound rent, which consequently causes the apparent expense of the poor to exceed the truth. The practice in question

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has a very bad effect on the industry of the poor: they are often employed in trivial business, the boys in particular, are of little use in the winter season. The men are careful not to earn more than they receive, and seem to think it the safer extreme to perform too little rather than too much. There are innumerable instances of their leaving the work at five o'clock, in the apprehension of increasing the scarcity of labour; and their master's interest in their labour being of short duration, they often neglect to check these habits of indolence, which "grow with their growth, and strengthen with their strength."

It sometimes happens that farmers refuse to take in a roundsman, though the plan of allowing half the money to be paid by the overseer, is contrived to furnish an inducement, by means of which a farmer may have a day's work performed for 8*d.* in the first instance; or must pay a proportional part toward the labourer's subsistence if he refuse to employ him.

On the same principle, it is customary in some places to allow 2*s.* 6*d.* to be spent by the overseer at the meetings, or vestries for considering the complaints of the poor, as also a guinea at the Easter meeting, for the purpose of inducing a competent number of the parishioners to attend; and the principle is apparently founded on good reasons.

An increase of the poor is pregnant with innumerable evils. Such as have little to fear, and nothing to hope, are often restrained by no feelings of honour or honesty. There are always a considerable number in every parish, whose firing consists entirely of broken hedges, which are conveyed home in dark nights, and such as have large families generally carry on the trade with impunity, as
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the farmers are not fond of providing entirely for a family of young children.

An increase of the number of illegitimate children is an acknowledged characteristic of the times, and reflects little honour on the morality of the present age.

This fruitful source of every species of profligacy adds not a little to the burdens of a parish, even in the first instance. The putative father is often sought, and sometimes found at 100 miles distance; and the expense, whether successful or not, amounts to 5*l.* or 6*l.* or the average annual expense of a pauper. If the man agrees to marry, the license, &c. amount to 5*l.* or 6*l.* more.

But on the other hand, if marriage is refused, and the man is able to procure a sum of money from 15*l.* to 25*l.* the parish generally agrees to release him from all obligation to keep the child.

This is mentioned more particularly, as such agreements are said to be *illegal*; and that the father ought to be *compelled* to keep the child. The Legislature appear to have overlooked a material circumstance, as every overseer is aware, that a man-servant, who has no respectable connexion, cannot be bound to provide for his offspring by any other mode than marriage. He may be sent to prison, but this does not effect their purpose. He may give a bond to the parish, but it will be of no more value than waste paper, as no responsible person will join in the bond, and the offender will find room sufficient in Great Britain, to elude the grasp of justice. The parish officers, therefore, adopt the only plan which can be of any utility, and procure on the average perhaps a sufficiency to discharge half the real expenses. A great number of the poor
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are indebted to bakers and shop-keepers from 40*s.* to 6*l.* or 7*l.* and aware of the impossibility in many cases of compelling them to pay their debts, they thus acquire a habit of dishonesty, and it is almost incredible what a variety of schemes some of them devise to increase their debts, though after the rate of only a groat a week.

Complaints have been sometimes made of the neglect and indolence of the overseers of the poor; but if a revision of the laws relative to the poor should take place, it will surely occur to the most superficial observer, that neglect must be expected in the management of a disagreeable office, which is almost the only one which is performed without a reward.

BEDFORD HOUSE OF INDUSTRY.

“The poor in the house are employed in the following manner: a manufacture of coarse baizes furnishes employment for all the boys five years of age, and some of the men; the remaining part of the men cultivate an acre and a half of garden-ground, and weed and keep in order 25 acres of sward land attached to the house. The old women spin flax to make linen for the use of the family; the other women (exclusive of those engaged in domestic concerns), and girls above six years old, make thread-lace. One-sixth of the earnings of the poor is paid weekly to those who work, by way of gratuity. The governor of the House of Industry adds, that the above employments have answered the most sanguine expectations of the directors of the establishment*.”

* Poor's-rate, &c. Abstract.

<i>Years.</i>	<i>Average No. of Poor.</i>	<i>Amount of Disbursements.</i>
1801	154	£.1855 0 1½
1802	134	1600 12 5½
1804	111	1586 14 4

The average expense of keeping the poor in work-houses has been before stated at 4s. 9¼d.; which is nearly as much as is often allowed for two aged paupers, who maintain an invincible repugnance to the idea of ending their days in those receptacles of age, indolence and infamy. The allowance to out-paupers is generally diminished by the establishment of a work-house, as; however well they may be managed, the poor generally consider them as a kind of parochial prisons.

BENEFIT SOCIETIES.

Many clubs are under regulations of questionable propriety, and the members are sometimes expelled for trivial deviations from the rules; but their utility, in preventing many applications for parochial relief, is well established. They consist, however, in general, of such as would not, under common circumstances, be chargeable to a parish, such as the lower order of tradesmen, &c. The injurious effects of box clubs (real or imaginary) are, I believe, entirely unknown in the county of Bedford.

CHAP. XVI.

OBSTACLES TO IMPROVEMENT.

THE obstacles which impede the advancement of agriculture, afford little room for any remarks that are peculiarly applicable to this county.

It is believed by some considerable farmers, that the cultivation of the land is less profitable than many other trades, in which it is said 15 per cent. is gained, in general, on the capital employed. A want of capital, when it occurs, is a considerable obstacle to the improvement of the soil, and is one of the inevitable consequences of a consolidation of farms. Those who occupy considerable tracts of land, are seldom known to acquire any great accession of wealth, without the aid of other profitable occupations; but the occupiers of poor soils, such as abound in some of the towns north of the Ouse, are said to be as poor as the soil. A considerable farmer in that district observed, that most of the neighbouring farmers were far from affluence, and rather struggled for existence than flourished in their occupations. The rent of these poor clays is low; but the poverty of the tenants is a proof, that it is not so low as the value of the soil, whose meagre produce keeps their pockets continually empty, and represses and stifles every idea which might lead to its improvement.

A very low rent is said to be generally seen in connexion with an indolent tenantry; but on the other
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hand, an exorbitant charge beyond the fair value of land, is calculated to destroy the reciprocal good-will and confidence of landlord and tenant, by which the latter is induced to pursue his own immediate interest, without any regard to futurity.

The effect which the *audit days* of the principal proprietors have on the markets which precede them, is a sufficient proof that the tenantry seldom possess much ready money, which does not quickly pass into the hands of the land-holders in rent, or the government in taxes. If a tenant improves the soil, he must previously be permitted to gain a sum competent to the purpose; he has a right to expect that the money expended in improvement of the soil will be returned by its produce with ample interest; but as leases are generally refused, it is obvious that an improving tenant has no legal security that the money expended will ever return into his pocket.

A want of disseminated knowledge is spoken of as a great obstacle to improvement: the farmers seldom love reading, but they generally learn so much of the laws of the land, as to enable them frequently to remark on the hazard of expending much money on land which they may be ordered to quit at a very short notice.

Several other hindrances to the progress of improvement might be mentioned; but the want of a new Act of Parliament to define the rights and duties of landlord and tenant, is perhaps of more importance than a combination of all other obstacles whatever.

VERMIN,

Are very prejudicial to agriculture, and the means employed in their destruction are not very effectual. There are people who make it their business to catch moles in cylindrical wooden traps, and they are generally paid after the rate of 2s. 6d. per dozen. The expense of destroying them in this manner seems to amount to about 1d. per acre. Sometimes a number of neighbouring farmers agree with a mole-catcher, at a fixed price per annum. There are a few farmers who keep ferrets; but rats are mostly destroyed by professional rat-catchers, at 2d. or 2½d. each.

Different poisonous ingredients are sometimes used, but with such partial success, that the number of these vermin is in most cases very considerable. If experiments were made with a view to ascertain the quantity of corn consumed by rats and mice, it is probable some more efficient means might be used to lessen their number.

The sparrow is generally considered as more prejudicial to agriculture than any other bird. In small enclosures, surrounded by thick hedges, these depredators attack the wheat crops, when the corn is beginning to lose its milkiness, with such undaunted perseverance, that to attempt their destruction with a gun, amounts to little more than a waste of powder and shot. The churchwardens of many parishes allow 2d. or 3d. per dozen, to the boys for destroying sparrows; and if larger sums were applied to this purpose, it is probable they might be almost exterminated.

It seems to be generally believed that rooks, though injurious to the crops of corn, both in their infant and
mature

mature state, are on the whole beneficial to the farmer, on account of the great number of worms, grubs, &c. which they devour by following the ploughs in summer, &c.

It is said to be unlucky to destroy a rookery; but if this be the case, the increase of grubs, wire-worms, &c. which might be the consequence of that practice, was perhaps the original cause of this superstitious notion.

When wheat is sown late on sandy soils, perhaps the lark destroys more of it, when first appearing above the ground, than any other bird, nor is it possible to drive them away by any ordinary means.

It is probable, that the mischiefs done to man by many species of birds, is mixed with some portion of good, the value of which cannot always be appreciated: even the crimes of the sparrow seem to admit of some palliation, according to Dr. Bradley, who computed that a pair of them carried to their young, in one week, not less than 3360 caterpillars, which in three months amounts to 43,680.

A gentleman in the north of the county observes, that the wire-worm is not very common, and that slugs are numerous, but not particularly mischievous. The slug was however observed to be very injurious to the pea-crop in 1807, destroying a great many plants by eating off all their leaves. Rolling the land has been recommended, to destroy this reptile: the success of which is doubted by some, but has been tried by very few. The wire-worm is supposed to be increased by the growth of artificial grasses, and is therefore observed sometimes to injure wheat which is sown after a temporary ley: but its depredations do not appear to be very extensive.

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“The wire-worm is the most formidable enemy to corn, particularly wheat upon fresh or burned land; so much so, as to render it precarious to sow this kind of grain upon them. I have been told, that those who have finished this burning in May, and have fallowed with two or three ploughings and harrowings, have escaped.

“I have not only heard, but experienced, that the wire-worm may be checked or stopped, by heavy rolling, when the ground is just top-dry, but wet within; also by trampling it with sheep, and even with horses or cows, in the same state.”—*J. Foster, Esq.*

CHAP. XVII.

MISCELLANEOUS ARTICLES.

SECT. I.—AGRICULTURAL SOCIETIES.

THE establishment of an Agricultural Society in Bedfordshire, took place in the year 1801, and, in the words of J. Foster, Esq. “ was founded by him, to whom we justly look up as the author and patron of all our rural improvements, the late Duke of Bedford.”

The number of the original members amounted to 111, whose subscriptions, the lowest of which was 10s. 6d. amounted to 118*l.* 13s.

Subsequently to the original formation of the Society, about sixty of the principal gentlemen agreed to continue their subscriptions for five years.

The premiums offered in the first year were the following: A premium of ten guineas to the Bedfordshire farmer, who shall produce a plough and team which shall plough half an acre of land in the best and cheapest manner (not less than five inches deep), within the space of three hours and a half. To the second best, six guineas. To the third, four guineas. To the fourth, two guineas. And proportional rewards to the ploughmen, from two guineas to half-a-guinea.

A premium of five guineas to the Bedfordshire labourer in husbandry, who shall have brought up the greatest number of children without parochial relief.

A premium of three guineas to the second, and two guineas to the third.

A premium of four guineas to the Bedfordshire labourer

bouter in husbandry, who has worked the longest time in the same place without interruption. To the second, two guineas. To the third, one guinea.

A premium of four guineas to the Bedfordshire male servant who has continued for the greatest length of time in farming service, on the same farm, or with one master or mistress. To the second, two guineas. To the third, one guinea. To female servants under the same conditions, premiums of three guineas, two guineas, and one guinea.

In 1802, an additional premium of ten guineas was offered to the Bedfordshire farmer who should have under-drained the greatest number of acres in proportion to the extent of his farm; as also, premiums of four, three, and two guineas, to the labourer in husbandry, who should have been the greatest number of years a member of a benefit club.

In the years 1803, 1804, 1805, and 1806, the premiums have borne much similarity to those first offered, with additional premiums to encourage the formation of new benefit societies, to extend the practice of under-draining, and the marling of sandy or gravelly lands.

The amount of the premiums which have been paid to the various candidates, are:

In the year 1801,	£. 58 16 0
1802,	103 19 0
1803,	113 19 6
1804,	87 3 0
1805,	81 7 6
1806,	77 14 0
1807,	51 19 6

The payments of the last four years mark a decline in the Society's funds.

MEANS OF IMPROVEMENT.

The measures which are calculated to improve this county, are equally applicable to the whole kingdom; and in this intention the removal of obstacles is necessarily the first step. Tenants sometimes injure the land previous to leaving it, and commit dilapidations which the landlord cannot always prevent or punish; but on the other hand, the tenantry who make extensive improvements, and invest a great portion of their capital in the bowels of the earth, are not considered, *in the eye of the law*, to have any claim on the landlord for remuneration.

It is easy to conceive, that the legislature of ancient times could not foresee, without a spirit of prophesy, the expensive improvements which would be undertaken by the cultivators of the present age. It is therefore the interest, as well as the duty, of those distinguished characters who devote their influence to the advancement of agriculture, to give the improvers of the soil a *legal right* to remuneration of the capital employed in any improvement of a farm, which they may be induced or compelled to leave.

In some calculations, 10 per cent. is allowed for the interest of the capital employed in improvements; but it ought to be considered, that the farmer has a just title to the capital itself, as well as a proper gain, or interest, for the use of it. If a farmer improves a field of twenty acres by *claying* or by hollow-draining, to the amount of 4*l.* per acre, the improvement will probably endure in some measure for fifteen years; the capital that is employed, suffers, therefore, a gradual decay,

decay, and vanishes entirely at the end of that period. Now, if the landlord possesses an unlimited power to order a tenant to quit the field so improved, the tenant will lose 80/. Instances of this kind seldom happen, because the farms generally continue in the same family for many years; but apprehensions of this kind are certainly among the causes of the feeble and cautious improvements of small farmers, whose occupations are seldom possessed by their children, but are often swallowed up in those which were already too large.

When a mutual confidence is established between landlord and tenant, by taking away the power of injuring each other, the example of a spirited mode of cultivation in the proprietors, will have much influence on the surrounding tenantry. Cheap publications on the most interesting parts of agriculture, could not fail to have a good effect; but in these, great care should be taken to place in a clear point of view, the expenses and profits of any new plan of cultivation. In the farms which are cultivated by the principal proprietors, the increased expenses are remarked by the surrounding farmers, and they seem apprehensive that the profits are lessened rather than increased by this means. For the credit of the art, it may be presumed that such apprehensions are generally unfounded; but it is obvious, that if the debtor and creditor sides of the accounts are not published, the fact must remain in uncertainty.

It is, however, by no means remarkable, that the gentlemen who farm for amusement or example, seldom favour the public with an account of their profits or losses.

The keeping of such accounts, with that degree of care and systematic arrangement, which is necessary to

render them of public utility, is a business of no small difficulty, and can scarcely be attended to by the manager of 200 acres, much less by those who are entrusted with farms of thrice that extent.

The formation of provincial agricultural societies, is undoubtedly very conducive to local improvement: but this depends greatly on the number and amount of the subscriptions which are applied to its support, and the subjects for which the premiums are offered.

Common farmers cannot be expected to subscribe very liberally in any case, but especially if their own interest in the business is not very obvious.

To engage this class of society, it is therefore necessary that the premiums which are offered should be purely agricultural. Particular care should also be taken, that the premiums may be gained as easily by small farmers as large ones, and this without excluding candidates for the omission of some trivial circumstance, which is neglected because it is *not understood*. It is often an unfortunate circumstance, that experiments or improvements are required to be made on a large scale, as ten or twenty acres; as it is easy to conceive, that one farmer may exhibit a greater degree of merit by draining five acres, than another who drains, or otherwise improves thirty acres. Add to this, the improvement of an *estate* seems more properly the subject of reward from the owner of it, than the public, while the improvement of the *art* is all that can be interesting to its professors. The improvement of the breed of cattle has engrossed much of the attention of modern cultivators, but I conceive the cultivation of arable land is a subject of equal, if not superior interest. The subjects which ought to be submitted to experiment are almost innumerable. The plough is
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considered as the most important of agricultural implements, and more money has been expended in premiums for this implement, than perhaps for any other purpose in husbandry; yet I conceive that little, if any thing, has been proved on the subject in this county. It requires indeed a week, rather than two or three hours, to examine into the merit of different ploughs. The drill-machine is seldom made the subject of a premium, yet the ill success of the row culture, seems attributable in many instances to the defects of the implements employed. The practice of offering a single large premium for each particular purpose, has always appeared to me to be founded on erroneous principles.

Let it be supposed that three candidates make claim to a competition for a prize of 30*l*. Now, it is possible that either of the claimants may exhibit a sufficiency of merit to obtain the premium, in case he were not excelled by the others, and consequently two of the candidates will return with the impression that merit is not often rewarded, and that they have spent their time and money to no purpose. Several others will be deterred from the attempt by its hopeless appearance.

But it is possible, that a sufficiency of merit may not be exhibited by any one of the candidates, and in this case, if their exclusion is not caused by the omission of something of obvious consequence, they will consider the fruits of exertion as *sour grapes*: or if it be a silver cup, it will be deemed the cup of Tantalus. If an experiment be not worth 40*l*. or 50*l*. it does not follow that it is of no value.

A premium of 30*l*. may be divided into five parts, as 8*l*. 7*l*. 6*l*. 5*l*. and 4*l*. and awarded according to merit: as the first prize may be refused, if there is any

good reason for such refusal, or two or more of the prizes may be awarded to a very meritorious candidate.

In the adjudication of premiums, the greatest circumspection is necessary; as prejudice will observe the slightest deviation which appears to owe its origin to flattery of names or titles.

Such as possess the least acquaintance with the scientific arts, will find no difficulty in believing that it is to *experiments* that agriculture must owe its ultimate perfection. A series of well-conducted experiments, is capable of affording decisive evidence with respect to most of the controverted subjects in husbandry; and would diffuse more light on the art, than can be expected from the accumulated experience of many centuries. It ought to be impressed on the minds of all who feel a desire, and possess the means of improving agriculture, that every result with which the husbandman is familiar, is derived from the compounded action of possibly half a score of distinct principles, and that to ascertain the precise value, cost, and effect of each of them in its separate state, ought to be the primary object of agricultural investigation. In the production of a crop of corn, or other vegetables, many causes contribute; among which may be enumerated, the depth, mechanical texture, and quality of the soil (the quantity and kind of manure which is mixed with it, and the intimacy of their union); the quantity and quality of the seed, the depth at which it is deposited, the regularity of disposition, or the bunches or rows in which it is distributed; the time of sowing, as affected by drought, wet, or frost, or as conducive to early ripeness, or a late ripening, which prevents the corn from filling properly, and causes a hazard of mildew; the

the influence of air, light, heat, and electricity; the effect and expense of hoeing and weeding; the consequence of early, or late harvesting; on the weight and quality of the corn, and on its susceptibility of growing, as for seed or malt. It is also desirable to know the relative exhaustion of the soil, by various kinds of crops; the effects of thin or thick sowing, and the reason why the ground appears to become surfeited or tired by a quick repetition of the green crops, as, red clover, tares, &c.

In the animal kingdom, the weighing machine is of primary importance, and its use is indispensable.

By means of this important implement, may be ascertained the quantity of grass, hay, clover, turnips, carrots, cabbages, potatoes, oil-cake, &c. which is consumed by every kind of animal, and consequently the intrinsic value of every kind of food may be known by the quantity of pork, mutton, &c. which it will produce on the average of various trials. The combined effects of two or three kinds of food may be tried, to discover whether chemical union causes the united effect to differ from what may be expected from calculation.

The weighing machine must be depended upon as the last resource (why not the first?) to determine the relative utility of horses and oxen, as beasts of labour.

How much hay is consumed by horses and oxen when at work, and when idle? What is the increase or decrease of weight which is caused by a month's labour or rest. What is the relative strength of horses and oxen? Such are a few only among the numerous questions which must be determined by experiments, aided by the use of machinery, or remain undecided to the end of time.

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With respect to the various kinds of manures, nothing short of chemical analysis is likely to ascertain their intrinsic and relative value. Such is also the case with respect to the numerous varieties of soil.

The county of Bedford has been little distinguished by the experimental spirit of its cultivators.

The late Duke of Bedford forms, indeed, an eminent exception to this remark, as His Grace spared neither attention nor money in the elucidation of any dubious fact; and when those who are most interested in the improvement of the soil, shall catch a portion of His Grace's luminous genius and persevering spirit, the art of husbandry will soon deserve the name of a Science. A great number of rewards have been distributed among those who have signalized themselves in various branches of agriculture; yet in this enlightened age it is well known, that a common farmer, who employs much of his attention in experiments for the advancement of his art, exposes himself to imminent danger of poverty and ruin. The little attention that is paid to experiments among the ordinary cultivators, is therefore no subject of wonder; but the inattention of gentlemen farmers can only be accounted for, by the small degree of interest they feel in the subject.

It is indeed a well-known fact, that if a gentleman occupies a farm for the same purpose as any other common farmer, viz. to gain money by it, the farm must be a large one; because the gains of 200 or 300 acres will scarcely support a bailiff, and return the legal interest of the capital. But if contemporary fame, and the grateful remembrance of posterity, be the objects in view, 100 acres of ground are amply sufficient for the purpose of experiments. A larger extent of ground would injure the cause: to fill an experimenter's

menter's hands with ordinary business is a fatal error, and never fails to destroy every hope of public benefit. A small portion of additional attention, would have quadrupled the value of many experiments which are now before the public.

There are, however, other powerful reasons which oppose the progress of scientific agriculture. In the present state of experimental knowledge, it is almost impossible to ascertain the particular subjects which need investigation; as the experiments of various ingenious individuals, who have thrown some degree of light on many subjects connected with husbandry, are scattered amongst an immense quantity of less interesting matter, in a variety of modern agricultural publications. It is therefore a necessary preliminary to the general establishment of experimental farms, to collect the accounts which have been already published, of such experiments as bear the stamp of merit and accuracy. A collection of this kind, properly classified and abridged, might be comprised, probably, in two moderate octavos, and would furnish a fund of information, which, in its original detached and insulated state, can never prove of any great utility. The importance of this kind of information, to a person employed in making experiments, is sufficiently obvious, as he ought not to mis-spend his time in examining subjects which have been sufficiently investigated, nor to attempt them in a way which has proved unsuccessful to others.

The works which it is necessary to examine on this occasion, comprise Mr. Young's *Annals*, and the other periodical works connected with husbandry; the whole of the publications of the Board of Agriculture, the Bath Society, the Farming Society of Ireland, the Society

ciety of Arts, and the writings of individuals who have detailed any account of experiments.

The merits of a work of this kind would depend much on the manner in which it was collected.

The writer ought not only to be an amateur of husbandry, but a person who is acquainted with the general practice of it, by which means he will be enabled to detect any material error in the statements which he may meet with, and to reject every inconclusive trial which militates with known and established facts. A considerable knowledge of chemistry is also requisite; as, without this, the utility of many experiments cannot be known and appreciated, nor the causes pointed out, that have rendered many attempts abortive.

APPENDIX.

Pisé Buildings.

AN experiment has been made with *Pisé*, at Dr. Macqueen's seat at Ridgmount, of which it may be proper to give a short account. In the year 1807 the Doctor added two wings to his house; the southern wing, or library, he built of *pisé*; but being apprehensive that he could not finish the other wing, of the same materials, before the wet season came on, he built the other of brick. The *pisé* wing was founded on a solid brick wall four feet high (two of which were under ground), and two broad. The operation of *pisé* began early in the season, and was finished in September. It was contracted for by a person who had worked under the directions of Mr. Salmon, of Woburn. The wing is thirty-six feet long, and about fifteen feet high. There is no upper story; the *pisé* work consists of only three sides, the fourth being the old wall of the house. The *pisé* is perfectly strong, and the room remarkably warm. To prevent rain from affecting the *pisé*, it was covered with Parker's cement, but it was found that the cement would not adhere to the *pisé*. After some months, therefore, it was recommended to the Doctor by Mr. Salmon, to remove the old cement, and to face the *pisé* with tiles, fixed in with what are called T nails, four inches long. The cement adhered to the tiles as well as it did to the brick.

It is supposed that the Scotch fir or larch, grown in
the

the south of England, is inferior to foreign wood ; but the Doctor has used the growth of his own estate ; flooring one of his wings with foreign, and the other with home growth, and has found the latter to answer equally well ; a circumstance strongly in favour of fir plantations. The trees, however, should be at least from 50 to 100 years old, and the wood well seasoned.

THE END.

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